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COMMERCIALIZATION OF NEW TECHNOLOGIES

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

INDUSTRY-GOVERNMENT COOPERATION TO SPEED COMMERCIALIZATION OF NEW TECHNOLOGIES

MAY 9, 1989

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COMMERCIALIZATION OF NEW TECHNOLOGIES

TUESDAY, MAY 9, 1989

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The Committee met at 9:35 a.m. in room SR-253, Russell Senate Office Building, Hon. Ernest Hollings [Chairman of the Committee] presiding.

Staff members assigned to this hearing: Pat Windham, professional staff counsel; Tom Cohen, staff counsel; and Fiona Branton, minority staff counsel.

OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. Good morning and welcome to the Committee's first technology and competitiveness hearing of the 101st Congress.

In the last Congress, this committee offered major new technology legislation, the Technology Competitiveness Act, a part of the Omnibus Trade and Competitiveness Act of 1988. It upgraded the old National Bureau of Standards into a National Institute of Standards and Technology (NIST). Not only will NIST continue to provide important support technologies to American industry, technology such as precise quality control techniques, but it also will expand its technology extension efforts and its programs to encourage greater private sector research.

A second statute created the post of Undersecretary of Commerce for Technology, which will provide a central focus for the Department's technology operations. The Commerce Department now has the authority it needs to help U.S. industry build what Dr. Robert White of the National Academy of Engineering calls the nation's civil technology base. That is a way of saying the combination of basic technologies and skilled people necessary to help our companies compete in this increasingly competitive world.

The need is there, the authority is there, and it is time to implement the 1988 technology legislation and get on with the business of restoring America's technological leadership.

The need for industry/government cooperation to build that technology base and speed the commercialization of new inventions is great. In field after field, America is literally going out of business.

Last September, the Council in Competitiveness released a report which shows that in 11 key industries, most of them started by Americans, our companies have lost significantly market share even here in our home market. These include important industries such as televisions, machine tools, semiconductors, and on down the line.

If anyone needs additional evidence, they should look at the May 1st Wall Street Journal. The headline reads, "Many Americans Fear U.S. Living Standards Have Stopped Rising. They Believe Their Children Face A Tougher Future, Nagging Lag in Productivity." The article goes on to say that while American workers remain the most productive in the world, other nations are catching up. We lag in improving productivity. We lag in turning new technologies into successful products and improved production processes. Our industry leaders know it and our citizens know it. We are in trouble.

These problems of technology and the related problems of trade policy and fiscal policy will not solve themselves. We need as a nation to develop and implement a sound strategy to restore our lagging competitiveness.

This morning's hearing will help us develop that strategy. We have three very distinguished witnesses: the Vice Chairman and head of engineering for one of our most important corporations, IBM; the Secretary of Commerce who has shown an interest in these issues of technology and competitiveness; and a senior American electronics association executive, who will release their consultants" landmark study on how to re-establish a viable television and consumer electronics industry in this country.

I look forward, of course, to the testimony and working with the committee and these witnesses and the Congress in developing a strong competitive technology policy, particularly the commercialization of that technology.

OPENING STATEMENT BY SENATOR DANFORTH

Senator DANFORTH. Mr. Chairman, I have no prepared statement but I do commend you for holding this hearing. I think that this is on a very, very important subject. I am not a scientist, I am not an engineer, but I can say that time and time again, I have talked to business leaders, I have talked to educators, and they have made essentially the same point. That point is that government policy and what is going on in universities does effect America's competitiveness.

And, therefore, it is absolutely necessary, I believe, that we in Congress and the Executive Branch examine the various policies of the Federal Government and ask ourselves whether those policies help or hurt the effort to create a competitive edge for business in the United States.

The CHAIRMAN. Senator Exon?

OPENING STATEMENT BY SENATOR EXON

Senator EXON. I have no opening statement and I am very anxious to hear from the witness. And I want to join in the remarks made by Senator Danforth. This is a very, very timely hearing, Mr. Chairman, and I am impressed with the quality of the witnesses that you have asked to testify.

The CHAIRMAN. Thank you. Senator Gore?

OPENING STATEMENT BY SENATOR GORE

Senator GORE. Mr. Chairman, I want to begin by commending you for your personal leadership and your leadership as chairman of this committee on this most important issue. I am proud to have a chance to work under you and with you.

One week from today, the Science, Technology, and Space Subcommittee will have a hearing building upon the work of today's hearing, when we look into high-definition television in much greater detail. We will hear a lot about that subject today and will be taking careful notes and will be pursuing various aspects of this problem and this challenge in the hearing next week.

In later hearings, we also intend to examine what America needs to do to maintain and solidify and further its lead in the field of super computers. Later in the year, we will be examining superconductivity.

These investigations follow your lead, Mr. Chairman, because the overarching question is how we can create in the United States of America a new model of cooperation to bring industry, universities and government together in order to focus attention, resources and research on areas of high priority.

We know, for example that high-definition television is such an area. Our subcommittee, in cooperation with the Chairman, will soon be offering legislation in the area of high-definition television and advanced computing. We have been consulting with some of the witnesses here this morning on what the details of those bills ought to include.

I look forward to the discussions this morning and look forward to continuing to work with you, Mr. Chairman.

The CHAIRMAN. Senator Kerry.

OPENING STATEMENT BY SENATOR KERRY

Senator KERRY. Mr. Chairman, thank you. I also join in congratulating your efforts in this field over the course of a long period of time, but particularly in the last months. I think, this committee has been on the cutting edge of what is the cutting edge of our technology efforts for the future. And obviously, there is an enormous amount for us to discuss about how certain laws may or may not need to be changed and what we need to do in order to respond in a better partnership in these areas, consistent with traditions of how we have done business in this country.

I have been working for some time on the area of the high-definition television and what it needs in order to move forward. Today I am introducing a very simple piece of legislation, which may well be built on by what the Secretary of Commerce is going to add somewhere in July. This legislation permits our corporate entities to join into joint ventures in the development as well as production of this kind of technology. I think this area is considerably restrained by virtue of the antitrust laws and, notwithstanding the changes we made last year on research, remain strained.

I hope that over the course of the next weeks and months, we are going to do more than simply listen to what we have been hearing now, I think, for four or five years about how we are continuing to drop behind and actually translate it into constructive legislative effort. I congratulate you for leading in that effort.

The CHAIRMAN. Well, I thank you. Senator Lott.

Senator LOTT. Mr. Chairman, I have no statement at this time. I am interested in the testimony.

The CHAIRMAN. Senator Burns.

Senator BURNS. I have no statement, thank you.

The CHAIRMAN. Senator Pressler.

OPENING STATEMENT BY SENATOR PRESSLER

Senator PRESSLER. Mr. Chairman, thank you for calling this hearing on the proper role of the federal government in commercializing. new technologies. While there is much debate over what that role should be, there is a fair degree of concensus that the government has a role to play and must do something to prevent a further erosion of this country's position in important evolving technologies.

I don't think the real problem is a lack of effort in research and development. Both the federal government and private industry spend significant amounts on R&D. Don't get me wrong. This is important and the government can certainly do more to encourage R&D, perhaps by removing some of the roadblocks to joint R&D ventures. But I don't see a real problem with developing new technological advances. The real problem seems to be an inability of American companies to compete in the marketplace with foreign, particularly Japanese, companies.

We need to determine the proper role of the government in fostering new technologies, such as advanced television. But looking to the future, we need to encourage the study of math and science in our schools and colleges. We are producing fewer mathematicians, scientists, and engineers than we need. It is essential that we address this problem.

Mr. Chairman, thank you again for scheduling this important hearing. I look forward to the comments and suggestions of this morning's witnesses.

The CHAIRMAN. I have a sstatement that Senator Kasten would like to have included in the record.

(The statement follows:)

OPENING STATEMENT BY SENATOR KASTEN

Mr. Chairman, I am pleased that the full committee today will be receiving testimony from our distinguished witnesses on the role of technology research, the commercialization of new technologies by American industry, and what the proper role of the federal government might be in assisting that commercialization. I commend you for holding this timely hearing.

America's ability to compete in the future in the markets throughout the world, and thus our standard of living, will depend not just on our ingenuity and inventiveness, but also our ability to market American products which are the fruit of this inventive spirit.

All too often in the past we have seen Americans develop technological breakthroughs, only to have our foreign competitors beat us at the equally important task of capitalizing on these developments in the markets of the world.

I am pleased that we will hear from Mr. Kuehler of IBM on his company's assessment of American technology today and what might be undertaken to improve our position. Further, the testimony of Ms. Hubbard of the American Electronics Association (AEA), particularly on that industry's plan relative to High-Definition Television (HDTV), will be instructive for this committee. We cannot allow any more American ideas to go the way of the general consumer electronics market which saw us loose 95% of our market share in a decade.

I also look forward to Secretary Mosbacher's testimony as to his views of the proper role of the government, and his Department, in assisting American commercialization of America's ideas.

We have lost our leadership in the computer field. Where we were once pre-eminent, there is now only one American manufacturer of supercomputers, with significant operations in my state. We hope to see a second emerge shortly, again I am proud to say, from Wisconsin. Through my efforts in assisting this new company, I recognize the tremendous capital and other resources required to see many of the new technologies to market.

In last year's Trade Bill we recognized the need for greater governmental coordination and assistance to private industry in the commercialization of new and existing technologies. We provided for the new Technology Administration within the Commerce Department and the transformation of the National Bureau of Standards into the National Institute of Standards and Technology. I look forward to the Secretary's views on how we can best put this organizational scheme to work for American industry and the American people.

As we look abroad and see the close cooperation between governments and the private sector, and between competing members of the private sector, I believe that it is time for us to develop new better ways of meeting this challenge.

We should look to what the government can do to assist our industries improve their competitiveness. We should review the workings of our anti-trust laws in this regard, along with other policies or conditions than hinder Americans in getting their present or new technologies to the consumers worldwide.

Government can assist in this effort not only through the funding and ordering of certain priorities within the governmental agencies, but more productively by providing the proper incentives for American companies to pursue, on their own or jointly, the commercialization of their ideas. Our policies should focus on removing impediments to our competitors and providing the incentives, guidance and mechanisms to ensure that we can bring our technologies to the marketplace.

While we want to see a better partnership between the government and industry in this area, government policy should not dictate the ground rules for our competitiveness. Thank you, Mr. Chairman.

The CHAIRMAN. It should be noted that our distinguished colleague and member of the committee, Senator Bentsen, the Chairman of Finance is absent. I was with him earlier this morning and we are working together on this issue. He has under his jurisdiction, of course, the matters of the capital gains, investment tax credits, financial aid and special trade representative. What we are trying to do here is within the Department of Commerce, which modified the mission of the Bureau of Standards making it into an institute of technology that can help industry, not just with weight measures but with techniques. With the actual development, that technology and the commercialization of it.

There is none better than IBM, which has been gearing up for this battle the past several years. We hear a lot about people doing business on the golf course, and we politicians on the floor of the Congress like to tell industry to get off the golf course and go back to work. IBM has done this and is leading the way. Today we have the Vice Chairman of IBM who is in charge of research and technology. Mr. Kuehler, we welcome you and would be delighted to hear from you at this time.

Senator LOTT. Mr. Chairman, if I could make one request. Is it possible to get these cameras moved back or around some so we could see the witnesses?

The CHAIRMAN. We are going to have to move that so the senators on the Committee panel can see—Senator Lott, you can go over there until another senator comes. The television crews are going to have to oblige the committee. We appreciate your coverage.

[Pause]

The CHAIRMAN. I thank you very much. You can proceed, please.

STATEMENT OF JACK D. KUEHLER, VICE CHAIRMAN OF THE BOARD, IBM CORP.

Mr. KUEHLER. Thank you Mr. Chairman. My name is Jack Keuhler, Vice President of IBM, and we appreciate the opportunity to discuss our views on the relationships between competitiveness and technology from the vantage point of the computer industry.

As you have said so well, Mr. Chairman, the United States faces a major competitive challenge. The success of foreign products in our market, the relative inability of many U.S. companies to compete overseas, the decline of major industries and our nagging trade deficit are all symptoms of this challenge. It is disturbing that these symptoms appear in a country that produces more nobel laureates and makes more scientific breakthroughs, large and small, than any other country.

IBM is very concerned with negative trends affecting important segments of the electronics industry. If these negative trends continue, there will be substantial risk to the rest of the electronics industry.

Defined broadly, electronics is the largest industry in the United States. It employs about 3 million workers, produces over 400 billion dollars in products, of which 41 billion are exported. It accounts for 40 percent of all U.S. patents and conducts 20 percent of all U.S. industrial research. Electronics companies spend an average of 8 percent of their sales on R&D, the highest rate in the U.S. economy.

Beyond its economic importance, electronics is a vital part of our nation's defense and security. Moreover, electronic products and services contribute to productivity gains throughout the private and the public sectors.

IBM is relatively well positioned but no company is immune from competitive realities. IBM and the U.S. information industry face intense worldwide competition. IBM and other U.S. manufacturers have areas where we enjoy a solid technology lead over non U.S. companies. These areas include systems software, hard disc files, the electronic packaging of semiconductor components, high end technology, but maintaining that lead is becoming increasingly difficult.

Software has been a traditional strength of IBM and U.S. industry. Unfortunately, there have been instances where non-U.S. firms have tried to cut into our software lead by stealing our intellectual assets. U.S. industry loses billions of dollars in revenue each year from the piracy of intellectual property assets. This is why U.S. government efforts to convince other governments to provide effective protection for software under the intellectual property laws are very critical.

Moreover, legitimate competition in software is intense and growing. The Japanese have impressive projects aimed at turning software, particularly systems software, into a commodity. Given their success with commodity-like products we should not feel confident that the U.S. lead in this strategic area is at all secure.

On the hardware side, we are concerned with the vitality of the essential infrastructure of our industry, be it silicon wafer production, semiconductor chips, tools, test equipment used to manufacture semiconductor technology. This infrastructure is important because semiconductor chips are increasingly at the heart, as you know so well, of finished good in many industries: appliances, automobiles, consumer electronics, medical instruments, and computers, to name just a few.

IBM is a U.S.-based company. The U.S. is our largest market, where we do most of our manufacturing, research and development. Therefore, to maintain our competitiveness we must have strong domestic sources of supply. A declining electronics industry will ultimately weaken IBM and all other U.S. users of electronic componentry. IBM and other concerned companies in the electronics industry have been working hard to improve the outlook for this infrastructure.

This concern was the motivation behind SEMATECH, a research and development consortium aimed at improving the manufacturing technics for semiconductor chips. We are very impressed with the progress of SEMATECH and we think it is a good model for cooperation among government, academia and industry. SEMATECH is only one effort.

A new manufacturing technology looms on the horizon for semiconductors, and you have read, I am sure a little bit about it, it is called X-ray lithography. IBM is building an advanced technology certain in our East Fishkill, New York facility to begin to explore this manufacturing technology, which we believe promises substantial breakthroughs for manufacturing of new generations of denser and more reliable semicon-

ductor chips. By the time this facility is operational, we will have invested hundreds of millions of dollars in our effort.

While this is the first such facility in the United States, there are 19 either planned or under construction in Japan. IBM has offered to open this facility for use by the United States government and U.S. companies in the semiconducter industry.

Moreover, we are interested in participating in a high technology cooperative effort along the lines of SEMATECH for X-ray lithography. We are convinced that the negative trends to which I have referred will only be reversed through positive action. Simply adding more programs, creating more committees or adding or attending more meeting won't help a losing poker hand. This competitive problem has been studied extensively, and I have participated in my share. We do not need more studies; we need to act.

There are things the private sector must do, things the government can do, and things we can do together. Now, I start with the private sector because this is where the competitive battle is fought. The government can encourage this effort, but it is the private sector, in my judgment, that ultimately must reverse these negative trends. Business must adjust to the new realities of international competition, which are telling every business to get sharp or retire from the scene.

Businesses must be totally dedicated to providing customers the highest quality products and service. Business must quicken the cycle times of product introductions, take a long-range view and be prepared to undertake difficult transitions. Change is never easy.

Let me cite some of the IBM companies most recent experiences. We employ 380,000 people in 132 countries. We have 5 million customers and we offer more than 10,000 products and services. We are undergoing a thorough transformation of our entire business to ensure that we are as competitive as we know how to be. Over the past three years, we have slimmed down and reshaped our worldwide organization. We have reduced headcount through attrition, retirement and voluntary programs by nearly 20,000 people. We have reassigned and retrained 60,000 people more. We have increased the number of programmers and sales representatives by 20,000. We have reduced worldwide staffs by 11,000 and managers by 3,000. We have eliminated work that does not need doing in every area of the business with hundreds of study efforts large and small to seek out those opportunities.

IBM is not alone in taking such actions. Successful U.S. businesses are adjusting to meet their customers needs. This is a challenge that every business must face in its own labs, plants and board rooms.

Now, what is the proper role for government in encouraging such adjustments and maintaining an atmosphere allowing each U.S. company to maximize its individual competitiveness? It can reinforce the R&D infrastructure by making the R&D tax credit permanent and fixing the rules for the allocation of R&D to foreign-sourced income. These are important motivators for industrial research which I would be happy to speak more about in the question and answer session.

The National Cooperative Research Act was a good start aimed at allowing companies to combine talent and R&D, and SEMATECH was an outgrowth of that effort. More consortia are needed. It may even be desirable to allow these consortia to produce as well as to R&D, as the Senator has described some work and legislation underway down that track. However, antitrust concerns cause business, especially the large ones to shy away from joint production projects or cause such projects to be organized in a less-than-optimal fashion. Legislative efforts are just beginning to address the question of production joint ventures and they represent an important step in the right direction.

In areas where the U.S. is in the lead, intellectual property, investment, and services such as telecommunications, government can help sustain our competitiveness by producing, by broadening GATT to include them and by aggressively pursuing these concerns with our trading partners.

I know you agree that the U.S. needs to get its fiscal house in order. The deficit is a fundamental economic concern that effects the cost of capital. The high cost of capital increases the cost of doing business in the United States.

The government, through the Commerce Department with the new Undersecretary for Technology and NIST, as the Chairman mentioned, the Department of Defense DARPA, and NSF, is now positioned, I think, to act as a real catalyst. It can bring industry, government and academia together to work on common R&D areas requiring substantial investment, investment beyond the abilities of smaller companies and in many cases larger ones to fund individually.

The kind of cooperation I envision would involve both large and small high technology concerns working in consort, encouraged by appropriate agencies, in an economic environment conducive to innovation and investment.

Now, it is not just the technologies of X-ray lithography, chip production, superconductivity or HDTV that are in the news today and of critical interest to many. This must be an ongoing process for critical technologies as they emerge.

Likewise, U.S. education is an area where effective cooperation between business, academia and government at all levels can result in much-needed improvement. We face a critical challenge: the challenge of educating our young people and providing them with skills our economy increasingly demands.

This challenge is pervasive. Illiteracy, drop-out rates, underachievement, all these cost business and society dearly. Dropouts alone cost our society in wasted human potential, lost taxes and wages, and public assistance over $240 billion annually. And business must spend over $30 billion every year to train and retrain employees. One in three companies must provide basic or remedial instruction to newly hired workers.

Moreover, we are not producing the type of professionals we will need to be competitive with the rest of the world. According to a recent Federal study, by the year 2010, the U.S. could suffer a short fall of as

many as 560,000 science and engineering professionals. Japan, with a population one half ours, graduates twice as many engineers and every year well into the next decade, Japan will graduate 10,000 more engineers than we will. We have our work cut out for us.

Business is an important customer of education, and our future competitiveness will be linked to how well our students are prepared to be future employees. And I really believe that is perhaps one of the most fundamental competitive issues we face as a nation: a well-educated workforce skilled in the sciences, mathematics and engineering.

There are factors affecting competitiveness that I have not mentioned. In some countries, the cost of labor is lower, in others the nature of society and its influence on economic competition, the integration of business organizations appear to make it easier in some countries to bring new products from idea to marketplace. Long-term investment, critical to the introduction of new technologies, is elsewhere more heavily emphasized.

By themselves, labor costs, societal differences, integration of businesses, views of long-term investment versus short-term gains do not preclude American competitive success. Nor can government or business change these circumstances overnight.

The bottom line, however, is that the time has come for American industry and American Government to recognize the competitive realities of the global marketplace, to gather our strengths, to cooperate to the extent required to achieve world class research, development, and production efficiencies throughout American industry and, most important, to produce and enhance innovative, quality products and services at prices that are compelling to the worldwide market.

Thank you, MR. Chairman.

The CHAIRMAN. Thank you. It is a good thing I got you up here to testify about the deficit and about education. But the main thing is that private industry cannot do it alone, as it understand your statement is saying. I agree with you that you say the private sector is the one that will ultimately reverse the negative trends, and we want to keep it as private as it can be without government interference but we are not afforded that luxury any longer.

As I understand it, you have reduced your staff. You are retraining your workers. You have a rate of investment, let us say in electronics, of eight percent. What would be the comparable investment in Japan on electronics in research?

Mr. KUEHLER. In general, Mr. Chairman, they are equal or greater than the eight percent of revenue, in most cases greater.

The CHAIRMAN. But that is mostly as between private and government, mostly a government investment in research in Japan as compared to a private investments.

Mr. KUEHLER. No, sir. The number that I gave you would actually be how the companies would report it. If we were then to aggregate the support that the Japanese companies get from government, I am sure it would be higher.

The CHAIRMAN. It would be higher?

Mr. KUEHLER. Yes, sir.

The CHAIRMAN. So it is about an eight percent average investment by both private industry in Japan and private industry here in America, but then you have the embellishment of government assistance in research.

Mr. KUEHLER. Yes. One way that we looked at that, Mr. Chairman, in our company, we are investing in R&D now to the tune of about 9.9 percent of our revenue is in R&D. We are a little higher than the electronics industry, and as I mentioned, the electronics industry is much higher than most all other industries in our country.

If I were to take typical Japanese companies and give you that same number which I do not have at my fingertip, I think it would be higher in most cases than the IBM Company's number, and then if we were to aggregate with that the help they receive from government, higher yet.

The issue as I think you have described it and I certainly agree is they are investing heavily and at an ever increasing rate and in many cases well beyond what U.S. business are investing in R&D.

The CHAIRMAN. Well, in one area that you testified on X-ray lithography, you said you have one large facility. But the Japanese have, in contrast, 19?

Mr. KUEHLER. That is correct, Mr. Chairman. It is mind boggling. Let me spend a moment on that.

The CHAIRMAN. That is what we would like to hear.

Mr. KUEHLER. As you know so well, semiconductor technology continues moving forward at an ever rapid pace, faster each year than the year before. It is limited only by the ability to invest in the new plants and equipment, the technologies, and the ideas. It is not limited by creativity. Scientists know what to do to build a faster chip, more circuits per chip, smaller circuits. The issue is how do I develop them more quickly, and then how do I afford and build the new manufacturing facilities with the new tooling and test equipment to manufacture them.

Having said that, on the horizon as only one element of the process of development and manufacturing semiconductors is what you have heard as X-ray lithography. I mention that as only one element but it is very key, because we believe it will appear in the time frame of the mid 1990s and it will be in the era of 64 megabyte DRAMs and high speed circuits, and it allows one to fabricate very, very small line widths and create very fast circuits.

We have been working, I believe, Mr. Chairman, for 10 to 12 years on X-ray lithography technology in concert with Brookhaven National Laboratory using to generate X-rays, if you will permit me, a syncratron.

Now it is not just that device but all of the etching, the process and the other tools that go with it, and we pride ourselves as being in this country in a true leadership position. Then, as I said, now we are building an advanced technology center in East Fishkill. We are aggregating from IBM research, IBM Burlington, IBM East Fishkill, the best and

the brightest to really go for it, taking advantage of this new X-ray lithography.

Having said that, we are the only, today, the only company, commercial company, that is doing this and this will be a state-of-the-art facility that by the time we move in and start sometime next year we will have spent $435 million on that facility. That is not to produce. That is just to develop. By the time we build a factory to produce we will be beyond the $1 billion mark in terms of investment, which gives you some insight in the capital intensive nature of this business to remain in the leadership position.

You are correct, sir. I said we are the only one that I am aware of that has such a commercial venture, and the Japanese companies today have 19 of them in various stages of completion and their bills individually are every bit as much as what I described to you the IBM Company is paying.

The CHAIRMAN. As you described that lithography is so key to this technology development and the commercialization of electronic computers and televison. Let us elaborate for the committee why IBM is so interested in high definition television. You know we had a difficult time getting this committee to understand the common carrier signals and data transmission was one in the same, and we could not distinguish and we never could find out how to regulate AT&T and the competition.

In a similar fashion now but in a delightful way, really television is computers and computers are television, is that not correct? You are really interested not to get one of these programs, a happier view of it at eight o'clock at night. Frankly, you know if you lose out on the high definition television, you lose out on computers. Am I right or wrong, and elaborate on it either way?

Mr. KUEHLER. Mr. Chairman, if you would allow me to respond with a paragraph to that rather than a sentence.

The CHAIRMAN. Surely.

Mr. KUEHLER. I would suggest to you that, first, we are very interested in HDTV as you described as is the whole electronics industry, because it is clearly one of the drivers, which is the term used, for semiconductor technology. It packages semiconductor technology. If it is successful, it is sold in huge quantities and, therefore, it stimulates the semiconductor industry and forces the U.S. semiconductor industry more and more into a leadership position and provides the volumes to sustain the enormous capital investments that we just talked about.

So because we are very interested in the revitalization of the U.S. semiconductor industry and the infrastructure that it drives, the tools and the test equipment which IBM also buys and uses for our development in this country, HDTV is not only a symbol but a driver of the competitiveness of the semiconductor industry and the electronics industry.

Now you asked more fully is HDTV set a computer. If you would permit me, I would like to say that there is an intersection between HDTV and computers in that in some fashion they use similar circuits and technology, but in some areas they do not.

So it is really the revitalization and the necessity to have a competitive semiconductor industry that makes the IBM Company very, very concerned and enthusiastic towards the efforts that you and others in government are doing to bring that to the table and to a head.

Finally, the personal computer business which I know you are familiar with is the one that comes closest to using the low cost circuits, the digitization of video that is also used in HDTV, and, in fact, in our personal computer today we use HDTV technology to generate the image that you see when you use a personal computer.

So there is an intersection of the technology and there is a revitalization of the industry into leadership format that I think is important, not only to our company but to the American electronics industry.

Forgive me for spending a little longer to answer that question.

The CHAIRMAN. That is fine. Thank you. Senator Danforth.

Senator DANFORTH. Mr. Kuehler, in your statement where you get to the point about what is the proper role for government, the first thing that you mention is making the research and development tax credit permanent.

Now some of us on this committee are on the Finance Committee, but I do not think anybody who is here right now is, and for those who are not on the Finance Committee, we have had similar testimony over and over again. Could you just very briefly explain why making the R&D tax credit permanent is important?

Mr. KUEHLER. I would be pleased to. If you would accept for a moment the vision that semiconductor technology has in front of it many opportunities to improve better, faster, cheaper. Therefore, a company who is on the leading edge of the latest, the newest and the best, by definition, as they package that into a product, tends to have the most competitive product in the marketplace.

To be the leading company, particularly when you are competing globally now with very good Japanese companies who seem to have an unlimited amount of capital, at a low cost of capital, an unlimited amount of R&D funding, causes the U.S. manufacturer, if they want to be on the leadership edge, to do the same thing.

Now let me tell you what we are doing in our company and we are typical not atypical. In an effort to get to the marketplace as soon as possible with the latest technology, in the old days, and I can say that after 31 years in the IBM Company, one would develop the technology, spend three or four years, then build the new manufacturing facility that would use it after the technology was proven--another two or three years--then devlope the product that was going to use it. The end result is between six and nine years to the marketplace with that latest technology.

As you know so well, Senator, if you can shorten that cycle in any possible way, your product is going to be much more competitive and your competitors are doing it.

Now, having said that, to shorten it of course we are looking for new tools, and efficiencies, and ways, but the other brut force way, which is very effective, is now we start the development of a new semiconductor

chip and, in parallel, we commit the capital and build the new factory before we have ever shown the feasibility of the chip so that we have the factory ready when hopefully the development team succeeds.

In addition to that, we start the next generation semiconductor chip one or two years down the pike before the first one has even shown feasibility, and the new factor, and in some cases we have three of those going, staffed at the same time. The end result is an enormous and growing investment in capital.

In addition to that, hopefully successfully, a quicker in the marketplace result to maintain your edge in competitiveness which is what the competitor is doing.

Having said that, Senator, the need to spend more R&D, like it or not, is fundamental to being in the marketplace as soon as possible with a competitive offering. The need to get capital in this huge capital-intensive business we are in at an ever increasing rate makes two things very important. Anything that stimulates R&D in this parallel effort I have described makes a company affordably able to do it to compete, and anything that provides lower cost of capital for this--a factory is $500 million in the IBM Company--is directly tuned to the competitiveness of that company.

If the R&D tax credit is here today, gone tomorrow, maybe day after tomorrow, we are not sure, we are making investments over three, four, and five year time frames, and our company like others has to have a profile of how much we can afford over a reasonable period of time. That is as succinctly as I can respond to your very good question.

Senator DANFORTH. Thank you very much. I say by way of commercial the sign-up list is still open for potential co-sponsors for the R&D bill.

Mr. KUEHLER. I will sign it, Senator, but it will not help.

Senator DANFORTH. I would like to ask you one other question. I am afraid it also is a big one. I would like you to address the question of industrial policy.

One of your, I suppose, competitors, a Mr. C. J. Vanderklugt, K-l-u-g-t, from the Philips Company——

Mr. KUEHLER. That is correct.

Senator DANFORTH.——spoke to the European Parliament last March and called pointblank for an industrial policy. He said, in fact, "We will have to formulate a common industrial policy that responds to the challenges presented to us by technology and competition."

Of course, industrial policy is generally thought among many people to be kind of a dirty phrase. The Wall Street Journal, among others, editorialized against Mr. Vanderklugt's speech. There was an article in the Washington Post a couple of days ago about whether or not the Commerce Department is moving toward industrial policy.

Could you, hopefully reasonably briefly, help us think about industrial policy, whether it is a good thing or a bad thing, what it is and what it should be and what it should not be?

Mr. KUEHLER. Senator Danforth, you certainly have some very good questions. For starters, the term industrial policy means so many different things to so many people that I really do not feel comfortable in using that term and then trying to agree with it or disagree with it or sponsor it or aid it. What I really sincerely believe we must do, as in the context of my speech, is search for every way we can to help in a partnership relationship the creative juices that are definitely there in America in the electronics industry, and by help from the point of view of government, help them toward their goal which they believe they can achieve in every way we can think of. Every way we can think of in some cases amounts to consortiums like SEMATECH. We just talked about the R&D tax credit, ways of reducing the cost of capital, and so forth.

If industrial policy is helping the electronic companies in America become more competitive, competing in the global world they are now dealing with, then I suggest that I am strongly in support of that. If it means so many other different things, I have to really back off and redefine the term.

This country now has, as I mentioned, the largest number of Nobel Laureates, the largest number of scientific breakthroughs. We do not lack in research. We are leaders in research. We do not lack in creative ideas. We have them all the time. We do not lack in energy, dedication, or desire. What we need to do better is work in partnership where the government can help where industry and academia can help in teams optimized for the problem. That is really the whole thrust of my testimony and my request of you gentlemen to consider in your own ways how we can do that.

As the Chairman described the new role of NIST, I think that is going to be a real help. One of the things that many of our Japanese companies do so well--they are superb manufacturers--the ability to reduce the production cycle, to move manufacturing technology, the latest technology, into manufacturing in my view will be substantially helpful by some of these new centers that NIST, if funded, will be supplying.

So I do not really feel I am being responsive to your question, Senator, in that I am not sure I know exactly what you mean, nor have I talked to the gentleman from Philips lately to know exactly what he means. Forgive me for rambling a little bit. That is the best I can do with your question.

The CHAIRMAN. Mr. Kuehler, we all have learned after ten years, we do not mean winners and losers. You know, we started this debate 10 years ago with industrial policy, and all of us in Washington now are like Pavlov's dogs, we find something that works and we throw all the money at it. It is not winners and losers. Your answer and the Senator's question is right on target. It has to be in a measured way, and our bill is a measured way.

Particularly I like your answer with respect to investment because it is exactly what Corning did. Ira Magaziner in his new book, "The Silent War' outlines how Corning had to put 10 years investment, build

a plant two years ahead of time, and spend $300 million before they even got a customer. That is hard for a Washingtonian that thinks everybody is out goofing off on the golf course to understand.

Thank you very much. Senator Exon.

Senator EXON. Mr. Chairman, thank you very much. Welcome, Mr. Kuehler. I listened with great interest to your testimony. Let me ask you this question. I assume that the antitrust rules in Japan are significantly different than the antitrust rules and how they have been applied in the United States. Is that true?

Mr. KUEHLER. Senator, I can only say that from observation the companies in Japan seem to be able to work with each other and government more conveniently both in the R&D side, the research, and the production side. I would, therefore, conclude that they must not feel inhibited by the laws that they live with in Japan like in some cases we are here.

Senator EXON. Then what you are telling me is you are not versed in what the antitrust laws, if any, are in Japan compared with ours, is that correct?

Mr. KUEHLER. I really am not, Senator.

Senator EXON. I think that is something that staff should research for us to see where we go in this area. I have always been concerned about the fact that when our antitrust laws were founded here, for good reason, and I am not saying they should be all eliminated—I think the antitrust laws were put on the books many years ago were at a different time, a different age where the United States was paramount in almost everything. All we had to worry about was making sure that we did not have any violations of the antitrust laws that could adversely affect the United States and its interest. Times have changed, I suggest, and I think that is pretty vivid if we look at the trade situation today.

Let us get down to specifics. Do I understand correctly that the video cassette recorder, VCR system or idea, was invented and the majority of the R&D done in the United States; yet you cannot buy a VCR today that is not made in Japan? Was the VCR invented in the United States and, if so, how did the Japanese come to the near monopoly or monopoly that they have in that important industry today?

Mr. KUEHLER. Senator, yes it was, and there are many unfortunate examples like that. How each one got to the present state is probably a multiple set of stories, if you would permit me to reach for one which is generally consistent across all of these topics. My experience is, and I really want to give them credit for it, the Japanese company is a superb manufacturer. They do an excellent job of aggregating teams of development and manufacturing people and product a product with a very short cycle. Then built on that base of knowledgeable and experienced people, they increment from that product to the next one and the next one and the next one with shorter and shorter cycles of lower and lower cost and high quality.

That is an area where many companies, including my own, have had to develop substantial improvements to become superb manufacturers.

Senator EXON. And that is good.

Mr. KUEHLER. And that is good. Every CEO that I know and significant executive in major companies in America recognize that as something we must do better in and are doing better in.

The other thing that the Japanese companies have been superb at is taking ideas and commercializing them quickly and investing for the long-term with the intent of a return longer down the road than perhaps a typical American company in the past may have viewed it.

Those two factors, and there are many others, have in my view been very much behind the success of such things as the VCR, the television and so forth.

If I might just add one other thing, Senator, the Japanese companies put the best and the brightest people in manufacturing, the best graduates, the most creative. The people who run those companies by and large are manufacturing executives. At this point and time we in this country still are having both a difficult time finding educated people knowledgeable in manufacturing and getting them to join the manufacturing teams in the same way.

I must honestly tell you that every American company that I am familiar with is making major progress toward the objective of the team, the short development cycle, the quality image, and the best people.

Senator EXON. From what you say I can only assume that you think that American industry is on top of this situation, that we know where we are and why we have not been as aggressive as the Japanese and we are correcting that. Are you also telling us that we don't need any legislation in this area at all, or that we do need some legislation to assist us in that other side of the coin that you haven't addressed in answer to my question? How important are changes in our antitrust laws to make us more competitive?

Mr. KUEHLER. Senator, we definitely are making progress and we have a long way to go before I would represent to you that we are in good shape and we can relax and start playing golf. We are only beginning, but awareness and recognition is the key starting point.

As to your point on antitrust in this country, if we want the large companies to participate in consortium for production, if you want the IBMs and the others to participate, and I think you do and we should, we then need the improvements in the antitrust laws so that we can.

Senator EXON. One last question. We have been talking about the traditional process where companies acquire, buy, steal, or somehow get control of things for the general marketplace. We put through the Exon/Florio amendment as part of the trade bill which addressed an important subject for IBM and other companies that are major defense contractors.

Aside from the problems we have in international trade and the trade deficit, I think even more important is the concern that I have with foreign companies getting control of American companies. They buy them legitimately, but buy them essentially to convert high tech systems all up and down the line that you are familiar with. I do not believe

that is good for our national defense. Do you think the Exon/Florio measure can begin to help us in that area?

Mr. KUEHLER. Senator, I do not really feel comfortable nor competent to respond to that. It would only be an opinion and I really do not feel that I know enough about that to respond appropriately.

Senator EXON. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you. Senator Gore.

Senator GORE. Thank you very much, Mr. Chairman. Mr. Kuehler, I would like to begin by following up on the Chairman's question about HDTVs and ask you to elaborate on why we should pick this particular industry for special attention. We have, as the Chairman indicated, shied away from the whole idea of picking winners and losers and, yet, we are being led by industry to pick HDTV as a winner, as among other new technologies, for special attention.

Let me try to state a rudimentary case for it and ask you to correct it and tell me where I am going wrong. Studies indicate that when HDTVs are brought to the marketplace they may account for as much as 40 to 50 percent of all of the next generation semiconductors sold in the world, correct?

Mr. KUEHLER. I have seen those studies, Senator, yes. When I read those, the way I think on that is that if they stimulate competitive semiconductor technology, not only is a high volume carrier unto itself, but now that it has stimulated competitive semiconductor technology it in turn finds many other markets, too.

Senator GORE. I understand.

Mr. KUEHLER. It really is an aggregation I believe of both events. It is a big number.

Senator GORE. The conservative projections indicate that the worldwide market for high definition television will be so large that the next generation semiconductors used in HDTVs will account for as much as 40 to 50 percent of the total world marketplace for those semiconductors. We have long since quit processing information by analog devices, it will be done digitally. The amount of information to be processed is very large and so the semiconductors will be a quantum leap ahead of what we have now.

So in one product you have almost half of the marketplace. The company or country that controls the architecture and design of that product will be able to control the architecture and design of the next generation semiconductors destined for use in that product.

Second point. Semiconductor manufacturing is not uniquely but is unusually sensitive to economies of scale, correct?

Mr. KUEHLER. Yes, sir.

Senator GORE. Economies of scale come from the ratio of high front-end investment to low raw material and operating cost.

Mr. KUEHLER. Correct.

Senator GORE. The technology, the research, the manufacturing equipment for semiconductors is extremely expensive. The raw material is sometimes sand, pretty cheap. Now, if then one company or country controls the architecture and design of a product which then determines

the architecture and design of this kind of semiconductor, and if that semiconductor accounts for 40 to 50 percent of the worldwide marketplace for that whole generation of semiconductors, then that company or country will have achieved a hammlerlock on all of the information industries which can be influenced by the control of that cutting edge semiconductor.

So you get a flow in two directions. You have the device which is sold worldwide which determines the shape of the semiconductor. Then you control the semiconductor which then flows in the opposite direction to exert leverage and control over computers, telecommunication devices, and other products that will rely upon the next generation semiconductors designed and engineered for HDTVs in the first instance, correct?

Mr. KUEHLER. I would like, if you would permit me, to refine and hone that,if I may.

Senator GORE. Please.

Mr. KUEHLER. Rather than respond to what has been written, for which there is much written and much yet to be written, let me give you my view of why I think the importance of HDTV is being espoused so strongly. Some of it would fit within your scenario; some may not.

To me, the real issue is whether or not this country wants to get into, successfully, the development and the manufacturing of consumer electronics, consumer electronics that, today, is basically owned by Japanese companies, some Korean companies, some Taiwanese companies—clearly the Pacific Rim.

Now, if one thinks about the importance, or lack thereof, of being the country that develops and manufactures consumer electronics, and, if successful, can continue incrementing off that base to the next generation and the next generation consumer electronics, and then visualizes that that bases, whether it is measured in jobs or whether it is measured in all of the other economic effects, is the base to be used by all of the commodities, of which HDTV is just one, one visualizes a large, large market now and in the future, a large part of which, today, is supplied to this country by Japanese companies.

Senator GORE. All right, so——

Mr. KUEHLER. So, therefore, to me, the number is big because it is embodying consumer electronics and all that it means, and HDTV has become the symbol of, or the last bastion of, or the best opportunity, depending on whether you are looking at the positive or the negative side, to put this country into the role of a provider of consumer electronics, separate and distinct from how many HDTV sets one would sell.

Now, as far as your architecture and design concept, I really would have difficulty with the hammerlock scenario because hammerlocks are, to me, a function of technology leadership, period. If you are best and first and lowest in cost, you have a hammerlock. Anything less than that, you have trouble.

So, I just visualize HDTV as the fundamental topic of the day, to ask us all whether we want to, as a nation, stimulate, support, get behind and cause consumer electronics in this industry to come about for all of the good we now understand.

If I might just, and forgive me, add one last point. But, when we talk about consortiums and we talk about models, I do not think there is a good model for everything. I think each one has to be optimized for the problem. If it is superconductivity, the problem there is aggregating scientists in universities with people in business, trying try commercialize the idea, which may be decades away. And so it is small in number, key skills and not a lot of money.

When one thinks of HDTV, I think of the fact that good Japanese companies have been developing and manufacturing TV now for a long time, have been working on HDTV for 15, perhaps 20 years, are in-place development and manufacturing teams who have already set their standards with their heads down, with a huge start delta'd off of in-place people. And they are not fussing with whether the FCC will provide the spectrum, whether the cable industry is the right vehicle, with fiber optics, whether it should be satellite transmission. They have set the standard, the team is in place, their heads are down, and they have been in place for 15 years.

So, that kind of an existence term, to me, says, if we want to really take advantage of the benefits of consumer electronics, as we just talked about, and if we choose to use HDTV as our surrogate down that path, that, for starters, we have to aggregate quickly a set of people, people who are developers and manufacturers. We should conclude that no one is going to make a great deal of money in this venture for a long period of time against the competitor, and, therefore, the solution is going to be to put people in place to provide support from industry and government in very meaningful ways, and be prepared for the ticket to admission, which is going to be big and long.

Senator GORE. Mr. Chairman, I know my time is up. May I just say briefly in conclusion that you referred to X-ray lithography, as did the witness. I just simply want to note for the record that, without funding put into the budget at the rate of $25 million per year for two years by Congressman George Hochbrueckner over on the House side, X-ray lithography would not be alive in the United States today, and IBM would not be able to have its leadership role in it. So, inasmuch as we are exploring industry-government cooperation, I think that, too, serves as an example of why it is essential.

Mr. KUEHLER. And I applaud that.

The CHAIRMAN. And that is what we are looking at is our authorization bill for the National Institute of Standards and Technology.

Now, we want Senator Kerry who has been waiting since early here this morning, to have his turn at bat, and then Secretary Mosbacher is awaiting. Mr. Kuehler, you do not mind stepping aside for the Secretary of Commerce, do you?

Mr. KUEHLER. Not at all.

The CHAIRMAN. We had to arrange the schedule this way because Secretary Mosbacher had to be at another hearing earlier this morning. Senator Kerry.

Senator KERRY. Thank you very much, Mr. Chairman. Mr. Kuehler, as you know, as I said earlier, I am supportive of and I am introducing legislation, changing the antitrust law with respect to consortia, as you refer to it. But I would like to explore a couple things so we can have it on the record, if I may.

What would you say to those who would argue that consortia is really a new, polite term for a licensed monopoly, which will squeeze out other small companies and create a new set of possibly problematical relationships?

Mr. KUEHLER. Senator, I would first of all point out the advantages that everyone sees in consortia, which is an aggregation of critical skills, an aggregation of money, and also, the secondary help and support. I would then point out that the competitors around the world, in this global environment we are in, are doing that.

And I would then say that this is a new paradigm. We, in the electronics industry, must compete globally. One of the things to compete is to examine the strengths of our competitors, and, if, in fact, the competitors in other countries are doing this successfully and if we believe it enhances our hand to be competitive, then that is the new paradigm and that is what we must do.

Senator KERRY. Is the new paradigm really the old paradigm? I mean this in the sense that we have discovered suddenly that Japan, which has not labored under our restrictions as we moved into a more egalitarian marketplace over this past century has outdistanced us? Suddenly we are finding that where we have thousands of banks, they have 100 more less, where we have thousands of insurance companies, they have 136. Maybe big is better. Is that the bottom line?

Mr. KUEHLER. No, sir, I did not mean to suggest that. I think that it is an aggregation of skills, resources, money, and we have had, recently, a number of relationships with very small companies, some that are start-ups, and we hope to have more. And we find that the ideas, the creative approaches, and the high productivity concepts many times come from the smaller companies, not our own. And that an aggregation of techniques, ideas, thoughts and skills of small and large together is required to really have the major benefits of consortia.

Senator KERRY. As we try to change the antitrust laws and do so, do we have to build into our efforts some restraint as to what happens once you reach the product in the marketplace?

Mr. KUEHLER. Senator, that is a very thoughtful question that I really, I do not want to respond quickly to. The overriding principle, to me, would be, you want to lubricate or enhance or improve the ability of the large manufacturer to come in, which is difficult to do with today's antitrust laws. So, getting them in as a partner is, to me, the highest-level objective.

Your question is, once you have got them in, for how long and in what way, and it is a good question, and it is one that I just really would need to think more about.

Senator KERRY. Well, let me just say that I think we are going to have to think hard about that and maybe bite the bullet, because I do not think we can have our cake and eat it, too. I mean, if we are going to move into somebody's markets and permit a Motorola, IBM, AT&T to "collude,' literally, legally, in our interests, it is going to be very hard, once they have created a product, not to continue to do that in order to sustain the lead. I mean, how do you——

Mr. KUEHLER. Now, that is a very thoughtful point.

Senator KERRY. We were once at the stage where we had a television industry. We lost it. Let's say we create a HDTV industry and have the ability to market and so forth. What are the ingredients of keeping it?

Mr. KUEHLER. Yes. I think that is an excellent point.

Senator KERRY. How do you prevent everybody else from moving in and undercutting that in the same way they did previously?

Mr. KUEHLER. Excellent point. New paradigm.

Senator KERRY. Do you have the answer to that?

Mr. KUEHLER. I think that if—I am just—as I am—as you are talking, I am thinking. If you wanted my company to participate in HDTV in some way, which is an area we are not in, I think we would want to, before we signed up, we would certainly want to know that you were not going to invite us in; we were going to contribute and participate, and then you were going to throw us out.

Senator KERRY. Well, I do not think we ought to, which is why we are moving down a significant transition here——

Mr. KUEHLER. You have an excellent point——

Senator KERRY. ——if you look at the MIT study that was released last week——

Mr. KUEHLER. Excellent point——

Senator KERRY. ——about corporate transition, it clearly, this is part of that, I think.

But, let me come to another problem here and see how you respond to it. The Pentagon is currently taking bids on a $30 million expenditure for HDTV. Sony and Philips are both among those bidding on it.

Do you have a sense of how we should respond to the question of the expenditure of American taxpayers' dollars on foreign firms and their technologies, which may well be part of this effort. These technologies may then contribute to the ability of foreign firms to turn around and compete with us? Do we restrict membership to U.S. companies and not necessarily go for cheapest, most cost-effective, best?

Mr. KUEHLER. Well, Senator, I, again, would reach for the highest-level objective first, which is an aggregation of skills that would take on the very difficult task of putting this country into the consumer electronics game, again, as you pointed out, we are not.

And there are always secondary downsides to that, but, if, for example, Philips and Sony brought to the table skills, resources, knowledge and capability and the intent to develop and manufacture, in

this country, toward the higher-level objective of putting us back into consumer electronics, I would seriously consider inviting them in as a partner.

Senator KERRY. One final question. Dr. Robert White, the president of the National Academy of Engineering, has said that the view that the civil technology base in our country will be sustained by the private sector under all circumstances by the give and take of a free market determining the allocation of resources for technological development simply does not conform to the facts. Corporations and government agencies have been unable to play a sustained role in advancing U.S. technological leadership in key areas in the face of concerted government-private sector efforts of other nations.

You have mentioned some of those ingredients, the antitrust piece, but I would like to have you quickly tell us what you see as the key components, from the perspective of IBM, of being able to do precisely what he says we have not down and which other nations have done. Beyond the antitrust change, what are the key components? Cost of capital? Foreign dumping? Reciprocity? Where do you see the most critical choices we face?

Mr. KUEHLER. I think a large measure of the periphery has to be driven by the private sector. They have to be the drivers. I think a large measure of help has to be provided by the government, and you mentioned several which I will not go back through, cost of capital, R&D, and so forth. And you mentioned several others, inhibiting laws that get in the way.

And then another, which is to broaden the marketplace for the results of this output, opening the access in markets outside of this country is very necessary, too. I think that generally covers, to me, the key ingredients.

The CHAIRMAN. Thank you very much. Trent, you do not mind yielding—well, that is good.

Mr. Kuehler, you are one of those most thoughtful of witnesses we have had. We do not have them usually candid enough to tell us when they do not know something. And you are too valuable to let go. You do not mind setting aside just momentarily, do you?

Mr. KUEHLER. Not at all, sir.

The CHAIRMAN. All right. Let us get Secretary Mosbacher, because he is prepared to testify at this moment. We can come back to you and then, of course, we have Mr. Hubbard of the American Electronics Association. We want to hear from him this morning, also.

Mr. Secretary, the Committee welcomes you and we appreciate your arranging your schedule for an appearance here this morning. As you know, we are looking very closely at our authorization bill of Commerce's National Institute of Standards and Technology. And we hope to report out and enact an authorization bill to be appropriated for this year because we are playing catch-up ball in this field of competition.

We heard from outstanding industries like IBM. We have heard from Corning and many, many others, who, were ready, willing and able to put out literally billions of dollars before they even have a customer, have gotten very, very competitive in order to maintain some position of market share.

And yet they still need some help from our government. We are tickled to have you because we like your involvement in the FSX and a Secretary of Commerce who believes in Commerce. We would be delighted to hear from you at this time, sir.

STATEMENT OF HON. ROBERT A. MOSBACHER, SECRETARY, DEPARTMENT OF COMMERCE; ACCOMPANIED BY WAYNE BERMAN, COUNSEL TO THE SECRETARY

Secretary MOSBACHER. Thank you, Mr. Chairman, members of the Committee. It is a real pleasure to be with you this morning. I have a prepared statement which I ask be made part of the record.

The CHAIRMAN. It will be included in its entirety. You can highlight it as you wish.

Secretary MOSBACHER. Thank you. I thought I might briefly suggest what appear to be the key elements of our mutual goal, ensuring that the United States remains the major player in the 1990s and into the next century. The cold fact is that the United States has lost ground to our trade competitors in the high-tech area. The reasons for that are complex, but there are some symptoms which are easy to identify.

Our government laboratories, universities and high-tech industries are still head and shoulders above the competition in most areas of basic science research. But we are very poor in converting startling scientific advances into saleable commercial products. To compound that disadvantage, particularly in the telecommunications industry, court action, as in the dissolution of AT&T, has cost us dearly in the balance of trade and in our ability to maintain our lead in the next chapter of the telecommunications and the communications revolution.

Add to that the new teams that we face in the world markets. Europe will soon be one marketplace, but its major companies will also become a stronger, more cohesive, global marketing force. In Japan, the government and industry are and have been a working partnership.

We are in a competition for economic survival. Our trade competitors use every resource available to get a trading edge for their domestic exporters.

I am strongly suggesting that, in a limited period of time, we had better find a new philosophy, one which is crafted carefully and one which recognizes the critical importance of our domestic technology and manufacturing base before there is no domestic base.

There are signs that the situation is changing. The last administration and the Bush Administration, with the vital cooperation of Congress, have begun the task of restoring our economic and military security. At the Department of Commerce, I intend to use the tools which you have already given us to accelerate the return of our producing energies to pre-eminence.

I was recently taken to task in a leading business journal editorial for suggesting changes in the laws which govern how we do business. My point was, and is, in the case of HDTV and other high-tech products, our country needs to rethink our antitrust restrictions, both in R&D and, perhaps, even in production.

A review of the situation makes my position clear. We are behind in development of HDTV. HDTV and its underlying technologies will have a major bearing on the entire high-tech and communications revolution. It will affect military developments in the coming decades. We simply cannot afford to let our industries lose in the race because of public policy factors which are under our control.

I am against a government-led industrial policy. I support and strongly recommend an industry-led change. We do need to look at our antitrust policies, capital gains tax revisions, easing the cost of attracting capital, and other changes that may be needed. We must work together and act together to meet the competitiveness challenges of the new world trading system.

This is what I mean by economic security. Together, the Executive, the Congress, and, most of all, our private producers, as well as the people of the country, can meet and beat any challenges they see and understand. The problems are many and complex. EC 1992, Japan, cleverly crafted tariff and non-tariff harrassments and barriers, tax manipulation, patent piracy and others. The Congress has given us new tools; we are using them. Working together, we will succeed. Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF HON. ROBERT A. MOSBACHER, SECRETARY, DEPARTMENT OF COMMERCE

Mr. Chairman and members of the Committee, I am pleased to appear before you to discuss our nation's ability to remain technologically competitive, and what the government should do. If this country is to maintain and improve our economic strength in the years ahead, it will require the close cooperation of the Executive Branch, Congress and the private sector. President Bush has forcefully declared the importance of improving our long-term competitiveness and our position in world trade. I am here today to do the same.

There is no simple formula for improving our nation's competitiveness at home and abroad. Trade and financial policies, the quality of our educational system, and the strength of our private sector--especially its ability to create and commercialize new technologies--all are vital ingredients. Together we must make progress on each front.

Technology is most certainly a key element. With a strong lead in both science and technology through the 1950s, '60s and most of the '70s, America took for granted its place as the world's strongman in commercializing technology. Yankee ingenuity and manufacturing skills were the envy of the world. When the Nobel Prizes were awarded each year, we could be sure that U.S. scientists would be prominent. We want to ensure that U.S. scientists continue to do excellent research.

But we have learned the hard way that making breakthroughs in science and technology is not nearly enough. The realities of a changing world marketplace were driven home to us in the form of growing trade deficits, including the once-secure high-technology area. For example, in 1981 we enjoyed a trade surplus of $11.3 billion in electronics, telecommunications, and information processing. By 1987, the surplus had turned into a deficit of $3.1 billion. It is an understatement to say that we find ourselves challenged.

Today we know that we must do a better job moving new scientific and technical ideas from the laboratory to the marketplace. We know that we must be more innovative and persistent if we are to capture markets on both a national and a global scale.

Science and technology today is a global enterprise. Our competitors all recognize the link between a strong science and technology base and economic competitiveness. They know the critical importance of swiftly translating knowledge and technology developments into applications and new products and services that can succeed in world markets. All we need to do is look at what has happened in semiconductors, machine tools and consumer electronics--industries in which we once led the world. Nobel Prizes are not enough. Moreover, we must recognize that other

nations are devoting increasing resources to fostering their own basic research. We cannot rest on our laurels in the frontiers of science, either.

Having said that, I think we have made important progress in responding to technological challenges from abroad. Beyond the greater national awareness of technology's importance, there is a new spirit of cooperation between and among companies, universities, non-profit organizations, and government agencies at all levels. We are now working together to solve the technology-related problems that hinder long-term progress. Cooperation is taking the form of joint research and development ventures among companies that only yesterday were leery of speaking to each other. It is taking the form of high-technology councils and extension services, providing counsel and education where needed, and university-based "incubator" programs to help fuel small technology businesses--our nation's most creative commercial engine.

Some notable changes in federal policies, laws and regulations were made by Congress and the Reagan Administration during the past several years. These changes have helped industry to help itself in developing and then exploiting new technologies. The Small Business Innovation Development Act of 1982 created what is now an enormously effective R&D program. The National Cooperative Research Act of 1984 removed some of the antitrust disincentives facing companies which wanted to join together in conducting R&D.

The Federal Technology Transfer Act of 1986 gave federal agencies and private companies additional incentives for making better use of the commercially relevant but largely ignored creative output of government laboratories. R&D tax credits helped spur industry investment. Former President Reagan's 1987 Competitiveness Initiative establishing science and technology centers, speeding technology transfer from government-conducted R&D, enhancing our basic research base through the National Science Foundation, and better protecting our intellectual property rights has moved us toward improved technological and economic strength.

While we may be on the right track, tougher challenges lie ahead. There is much more that industry, academia, and government can and must do to improve our technological competitiveness. It is time for these three sectors of our nation, working in their appropriate roles as partners, to seize new opportunities. It is time to take maximum advantage of emerging technologies and advanced manufacturing processes that promise to expand markets for U.S. companies and to improve the quality of life and economic well-being of all Americans.

For some, this competitiveness challenge is a call to arms for the federal government to get intensively involved in the private sector's business. That is <u>not</u> the right approach. There can be no substitute for a healthy, forceful private sector that sees the

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opportunities for new markets and translates these opportunities into new and improved products, services and profits.

That does not mean the federal government should not assist industry, nor that we should be satisfied with the status quo. Government already is intricately involved in the process of technological innovation, through both direct and indirect support. Much of this support comes from basic research and defense R&D. What is needed from the federal government now--from both the Executive Branch and from Congress--is a more thoughtful, better coordinated, and supportive federal policy to address the problems and challenges of technology commercialization. We must always seek to improve our technology policies and programs to increase innovation, quality, productivity and growth in the private sector.

President Bush has signaled his intent to attack this problem vigorously. He is proposing to reduce the capital gains tax to encourage long-term investment and in parallel reduce the high-cost of capital that is a significant disadvantage for U.S. companies trying to compete. He is elevating the importance of science and technology in national policy formulation by making the White House Science Advisor an Assistant to the President. He wants to make the research and experimentation tax credit permanent, and to change the way the credit is calculated to increase its value to firms and allow new companies to take advantage of the credit. The President also wants to enhance the federal investment in basic

research, thereby safeguarding one of America's greatest strengths. He needs the support of this Committee to turn many of these proposals into action.

Moreover, as one of his top priorities, the President has asked me to lead an interagency effort under the Economic Policy Council to examine and report on a wide range of technology issues facing the nation. Our goal is to develop a comprehensive strategy for improving research, technology, development and innovation in the nation. The group, which includes more than a dozen federal departments and agencies, is identifying new policy objectives and specific options for Cabinet consideration. Separate task forces are addressing questions on:

- how to encourage national investment in R&D,
- the commercialization of technology and the appropriate roles of government, universities and business,
- how to assure equitable access and participation in international technology activities and standards initiatives, and
- how to be sure that we have the best human resources at our disposal.

While the Council's work is building upon the accomplishments and direction set by the Reagan Administration, along with the wisdom of previous analyses and recommendations from industry and others, we intend to concentrate on new ideas. We will focus on ideas that

are both practical and likely to solve real problems and deliver real benefits to the nation's technological and commercial interests.

The establishment of the Technology Administration within the Department provides U.S. industry with a much-needed focal point, catalyst, and advocate for commercial technology-related policies and initiatives to bring to the attention of Executive Branch. By participating in the interagency process and in other ways, this agency is drawing attention to the need to fully utilize our national investment in R&D for the commercialization of new and existing technologies. Uppermost in our minds is industry's concern about federal policies that create unnecessary statutory, regulatory, procurement, or other barriers to that goal of accelerated and improved commercialization.

The Technology Administration also is concentrating on ways to further improve the delivery of the federal government's technology-related services to the private sector, states and local governments. This includes making it easier for the private sector to contribute to decision making, participate in, and ultimately to share in realizing the benefits of the nearly $65 billion annual federal investment in R&D. Part and parcel of that job is timely tracking of emerging technologies--such as high-temperature superconductivity, biotechnology, advanced materials and high-performance computing--that will be economically important in the

years to come. We are updating a 1987 Commerce Department study on emerging technologies, and will use it to help generate a national commitment to R&D and the private sector's commercialization of these critical new areas.

The several agencies of the Technology Administration all have important roles to play in assisting industry as it strives to improve U.S. competitiveness through technology. Of special note is the expanded technology development and transfer mission assigned by the 1988 Trade Act to the National Institute of Standards and Technology. I am now reviewing these broad assignments to ensure that we use our resources in the most effective way. Certainly we support the goal of helping U.S. companies--especially smaller and medium-sized firms--to incorporate the latest technical advances.

The Commerce Department has many opportunities to work in partnership with industry to improve technological and economic competitiveness. The challenge is to create the most favorable environment for companies to do the job that, in the final analysis, only the private sector can do: harnessing the latest technologies to produce new and improved products and services.

Japan, many newly industrializing countries, and the Europeans have well-developed national strategies and industrial policies to help develop and commercialize technology. Their goal is to attain

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global market shares. They have targeted specific advanced technologies and commercial applications, including semiconductors, machine tools, consumer electronics, and telecommunications. For example, both Japan and the European Community have well-coordinated government-sponsored R&D consortia with industry to develop the underlying technologies, manufacturing capabilities, and marketing bases for High-Definition Television and its related products.

We must deal with this reality. We must make sure that our trade relations with these nations complement our national R&D policies and the technology interests of U.S. industry. While much has been made of Japan's technology and trade strengths, the European Community's 1992 initiative also poses significant technology and competitiveness implications for U.S. interests. EC 1992 also illustrates the types of issues we must address worldwide. We must ensure that standards development processes, as well as testing and certification procedures, do not shut out U.S. firms. We must be on guard against any measures which unilaterally block our access to knowledge and technology generated by our advanced trading partners. We must insist on symmetrical access to and participation in civilian government-sponsored R&D programs, particularly in emerging technologies. We must work toward improved protection for and equitable disposition of intellectual property rights. We must fight against other nations' patent systems and practices that are intended to give an unfair

competitive advantage to their own industries. In sum, we must have a two-way flow of knowledge with our advanced trading partners.

We must continue to evaluate true security threats posed by the export of technologically sophisticated equipment. We need to continue to reappraise on a regular basis the most critical and sensitive technologies to be sure that U.S. companies can take full advantage of exporting opportunities without jeopardizing national security.

Each of these tasks requires cooperation with other federal agencies. The Department of Defense is at the top of the list. Technology is equally crucial to the civilian and defense sectors. U.S. commercial and defense interests often converge; they have in common the need for a healthy industrial base.

The debate over the proposed FSX venture raised technology export and competitiveness issues to new levels within the government. The President's decision helps preserve the dominant position of U.S. aerospace technology and products in the world marketplace. The Commerce Department must take part in key policy decisions affecting U.S. commercial competitiveness and a strong industrial base. There are a variety of areas--including advanced manufacturing techniques and quality improvement methods--in which

DOD and my Department are working jointly and vigorously to do just that. I am committed to even stronger cooperation in the future.

If we are to meet the demands of a more competitive and technology-oriented global marketplace, the United States needs to improve the quality of products and services. This is an area where the private sector clearly must lead. The Commerce Department, however, can and is helping business to meet the quality challenge through the Malcolm Baldrige National Quality Award. Managed by the Department, and operated and supported in conjunction with the private sector, this award is the country's "Nobel Prize" for quality. By providing applicants with comprehensive guidelines for achieving total quality management, and by subjecting these firms to a rigorous review by private sector experts, the award program is helping to raise corporate America's quality consciousness and performance.

Workforce training and education is another area that traditionally has been largely outside the Commerce Department's domain. However, with new pressures from overseas competitors who are demonstrating success in putting new technologies to use, workforce training is emerging as a national issue with a strong technology component. Working with other agencies, this Department will be placing a higher priority on this issue.

Mr. Chairman, this country is faced with tremendous challenges to its economic security. There is no doubt that our trading competition will get tougher in the years ahead. But opportunities abound for improving our competitive position. We need to work together, harness our creative talent, entrepreneurial skills and vast technology resources, and be aggressive in ensuring that we have a level playing field on which to conduct business. The Commerce Department is committed to these tasks. Thank you.

The CHAIRMAN. Now, let's agree on everything you have testified. You have talked about a new philosophy. Is it not a fact what we really need is new money? We just talked with a previous witness, and you could not hear because you were awaiting us. And we understand.

But, right to that particular point, we had, in the late Carter years, an industrial policy, and we had witnesses running all around and saying "small is beautiful." They said that we had to understand that we are moving to a service economy. And now we have lost our manufacturing base about to lose it, and with it maybe our standard of living. Now we have sobered and gotten a new philosophy.

I find a feeling now amongst our colleagues in the Congress, in both houses, that we are now ready to compete. We all have that new philosophy. And we find, by enacting the Omnibus Trade Act, a confrontation of the elements, a realism. We have under our jurisdiction in this particular committee the National Standards and Technology Institute. Fine. I also believe in the investment tax credits and Senator Danforth's bill. I believe in the capital gains, if and when we can afford them.

But that is the territory of the Finance Committee. What we are looking at here is Commerce's National Institute of Technology, and you have not asked for any money. How are we going to get anything going only with conversation and no money?

Secretary MOSBACHER. Well, I think, first of all, that the industry must be the ones who are the primary suppliers of money for this. I think we can——

The CHAIRMAN. Well, as a secondary supplier, how much would you ask for? The Japanese have $700 million in high-definition television; Europeans have got $300 million. And, sure, I agree, let's let them be the prime resources, and, as you indicate, industry-led.

But we almost get the feel that OMB has grabbed hold of you. We had two witnesses up here yesterday who were scientists that could not testify to science. Now we have got a real business leader in the Secretary of Commerce that OMB is grabbing hold of and you cannot testify to business.

I mean, we have got to get some money in there to get things going, if we are going to compete and have any effort at all for the industry-led technology.

Secretary MOSBACHER. Well, Mr. Chairman, I am a businessman, and, I will have to admit, I have railed against government-led and government-restricted, and government thoughts on how we should do business in a former life. And, frankly, from my view, I was the victim of a lot of government, what we call "red tape," in the private sector.

The CHAIRMAN. I am talking about green money.

Secretary MOSBACHER. I am talking about industry, the private sector coming up with the money. I think if we give them the incentives in the form of giving them tax advantages, unfettering them from the standpoint of, to what degree they need to form consortia, to what degree they can work together, that that is our first priority.

Now, if that cannot get the job done, we already see, in the case of HDTV, that DARPA has earmarked $30 million. Let us see what we can do with the money. I think the private sector just need to know that we are going to have a constancy in policy and that we are going to do what we can to help them and let them get together and get the job done themselves.

The CHAIRMAN. Bluntly, do you believe in the National Institute of Standards and Technology?

Secretary MOSBACHER. Yes, sir.

The CHAIRMAN. Do you believe in funding it?

Secretary MOSBACHER. Well, it is not funded under the present budget constraints, and I am going to talk to Mr. Darman about the future——

The CHAIRMAN. Well, that is what we——

Secretary MOSBACHER. We finished 1990——

The CHAIRMAN. We have various regional research centers, and they are not funded. And we have, of course, assisting, every article you read, every expert on the Japanese and the competition, who will tell you that we need to have some assistance with respect to research.

Now, you mentioned the Finance Committee's end of it, capital gains. You also mentioned the Judiciary Committee, and their role with consortia and getting by antitrust. But here you are in the lead, Mr. Mosbacher, you have the heavy question, you are leading the Commerce Department, and with it the policy areas of trade and competition.

Now we have to finance this some how. Now, if I managed to get $30 million—I am on the Defense Appropriations Subcommittee where such a thing might be possible. I could not get money through Commerce. I have heard this testimony before and OMB always comes up. But they cannot keep up with the defense bill, it is so big; it is $300 billion. So to hide $30 million in there is very easy. And that is why we do it there.

But the truth of the matter is, in broadcasting equipment, application software, advanced videocassette technology, manufacturing methods, all of those that go into the civilian end which really means it goes into computerization. That is why IBM is up here; they are not even into high-definition television, and, as I understand it, do not intend to get into it.

But elements of HDTV are vital to computerization and to IBM holding onto their lead in computerization and you, in turn, holding onto the lead in business, not in defense. We need way more than $30 million there. Frankly, we need it in your department. We have wanted to hear from you today about what your needs were and what you thought was a good, salient request, as a starter, to get this thing going.

Secretary MOSBACHER. As you know, Mr. Chairman, we are in the midst of a review within the Administration as to what our policy will be on the HDTV and some of the high technology that goes with it. I cannot give you today a laundry list, but I can say to you we are going to be discussing all the aspects but we first need to start with giving a policy to the private sector that has some constancy and long-term goals, and, of course, it starts with these tax aspects that we have talked about.

The CHAIRMAN. Well, I am embarassed for you. We have a policy. We passed the bill. President Reagan signed it into law. In fact, on this side of the hill it passed 98 to 2 if I recall correctly. We had no difficulty at all in the mark-up of that particular bill in the conference. It was generally agreed to. We tried to respond to everyone's concerns and we wanted to get moving. Let me yield at this time to the distinguished senior Ranking Member.

Senator DANFORTH. Mr. Chairman, thank you very much. Mr. Secretary, I would like you to help us think out what is meant by industrial policy and what should not be meant by industrial policy. I read an article in the Washington Post a couple of days ago which claimed that you were an advocate of industrial policy and that has become such a negative word in the minds of some that I wonder if you would embrace that particular term?

I will just give you my own thoughts for whatever they are worth, and I believe that they are what the Administration is driving at. Clearly, governmental policy has an effect on business for good or ill. We have always recognized that as a country, from the days when federal patents were first established. We recognize that the government, through its policies, could encourage innovation, could encourage the inventiveness of the American people. We recognized that.

We certainly recognized from the early days of tax law that the Internal Revenue Code could be written to encourage or to discourage certain forms of activity. In the old days, in my opinion the good old days before the 1986 Tax Act, we had a number of incentives written in the Internal Revenue Code to provide specifically for the encouragement of certain activities which we believed were desirable. We had an investment tax credit, we had the capital gains differential, we had a research and development tax credit, all of which were removed by the 1986 Tax Act.

Now I understand that some people, and Senator Hollings expressed it very well, believe that government involvement in helping business must mean that the government has to take over and spend a lot of money.

It seems to me that if we decided that the budget meant absolutely nothing, still the total amount of money that the Federal Government could spend on innovation would have to be a minuscule portion of the total amount that we as a country are spending.

So it seems to me that industrial policy does not and should not mean that the Federal Government is going to take over all the decisions, that the Federal Government is going to muscle everybody else out of the way, that the Federal Government, by its spending, by its originality, by its inventiveness is going to be the cutting edge in this country. The Federal Government is not. It does certain things. NASA would be an example of that, certainly our cutting edge. By and large, the Federal Government has not been in that business.

I would like to ask you what you mean by industrial policy? Do you mean we should believe from listening to you and hearing your speech yesterday, in Detroit, and so on, that the policy of this administration is industrial policy, meaning massive governmental intervention in the marketplace, or is the policy of this Administration something other than that?

Secretary MOSBACHER. Senator, you said it much better than I am going to, but the reason I am against industrial policy is because to me it does mean that the government takes the lead, picks winners and losers, gets into the marketplace, and is a player all the way from research and development down through manufacturing.

What I have said before and what I firmly believe is that we do need to work on industry-led policy which means that the government encourages industry, does under certain circumstances help them with the cutting edge R&D as sort of a seed money approach in the things that are further out in front, but that the decisions as to what the priorities are and how it should proceed from there should be private sector industry decision, not government decisions.

Senator DANFORTH. Mr. Chairman, thank you very much.

The CHAIRMAN. Thank you very much. Senator Gore.

Senator GORE. Mr. Chairman, I found your interchange with our witness significant and I would like to build on it. Welcome, Mr. Secretary. I am delighted to have a chance to talk with you myself here.

You released this morning, Mr. Chairman, a list of key industries, identified where the technology originated, what the U.S. market share was a decade ago, and what the U.S. market share is today. VCRs is the example everybody uses but there are many, many other examples and the list is growing. What are we going to do about it? That is really the theme of this hearing.

I heard a presentation recently by Lester Thurow. I frequently disagree with him on prescriptions a lot, but sometimes his analysis is very provoking. He used this analogy. He asked why is it that the United States of America with a population of almost 250 million people wins fewer gold medals at the Olympics than East Germany with 15 or 20 million people? The answer is that East Germany uses methods for training athletes that are unacceptable to us. They pick kids at a very young age and predestine them to particular events, and we are not going to do that.

Well, what if we decided that it was important for us, as a national goal, to win a lot more gold medals at the Olympics? We still would not pick the methods used by East Germany. But if we were serious about it, we would be forced to recognize that our current way of training for the Olympics is completely and totally inadequate in the face of the kind of challenged posed by nations like East Germany.

Now we are not that serious about winning gold medals at the Olympics so we are not doing very much about it. Well, to take that analogy, if we decide that we are serious about competing effectively in world trade in an era of high technology, value added products, we still will not mimic the technics used by the Japanese or the South Koreans or Taiwanese, but we will be forced to recognize that the way we are competing now is totally inadequate in the face of the challenge which is posed.

Now HDTV and supercomputers represent case studies for discussion of how we can create a new American model for competing against the Asian model which we find unacceptable in several of its particulars.

We will hear next from the American Electronics Association which will present a specific set of recommendations on what we should do with regard to HDTV. We have heard from you, Mr. Secretary, and I am delighted with the level of attention you have devoted to this problem and the amount of discussion that you have generated, but you have not really proposed a viable strategy for competing successfully.

Now is it that our old way of thinking is so rigid that we cannot find money for a priority like the development of this industry/university/government effort in an area like HDTV? The AEA report calls specifically for $100 million a year in DARPA for three years, $500 million for low cost loans, $500 million for loan guarantees. To put a point on the question, where is the money? Are we really going to do anything? Are you willing to program for it? What are you going to do?

Secretary MOSBACHER. First I am going to disappoint you a little by not giving you a specific list. It is in the policy discussions of the Administration. I have had meetings with nearly 50 CEOs, many of them private and individual in this area. We have another meeting tomorrow with our advisory committee on HDTV. We have had an interagency set of meetings beneath the Cabinet level that have been chaired by Mr. Berman here. There is a lot going on. We have not come to the conclusion where we presented it to the President, nor has he signed off on any specific approach at this time.

We agree with you that it is going to take and is taking some real study and work. We are not sure and, frankly, I have serious doubts as to whether throwing money at the problem is the answer. It may need some additional funding, but we are not ready to come down and say, yes, that is it. We are ready to say in the tax areas we are ready to go because the President has signed off on those, and this is a great example of where that can be helpful.

Senator GORE. Let me conclude before my time runs completely out——

Secretary MOSBACHER. I am sorry to take so much time.

Senator GORE. No, I took much more than you did and I appreciate your response. It is a brand new world and we have to change and upgrade our thinking about it.

Let me close with a very brief analogy. In the area of global warming, we have heard a lot of talk and analysis, but when it comes down to specific policy prescriptions it becomes evident that there is a role for government that is inconsistent with the ideological view upon which this Administration founds its entire effort.

In this area, too, you have made an effort, along with others, to give us a clear picture of what needs to be done. But it soon becomes evident that the prescriptions point us toward a role for government that, once again, is inconsistent with the ideological underpinnings of this Administration. We are just going to have to change or else we are going to see the Chairman's list with which he began this hearing get an awful lot longer during your watch. I hope that does not happen. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you. Senator Kerry.

Senator KERRY. Thank you very much, Mr. Chairman. I do not want to chew up all my time entirely by joining in this commentary, but I do want to say this, that I fear, as the Chairman has said and as Senator Gore has said, that we are not seeing the kind of concerted response that many of us feel is necessary.

When you measure the rate of productivity growth in this country, the savings problem in this country, the net real investment being at its lowest since World War II coupled with the number of foreign patents being filed, and the lack of U.S. patents being filed, and so forth, all statistics this committees and others have compiled for a couple of years now it is evident that something must be done. We recognize the difficulties that you encountered firsthand in the FSX negotiations about whether or not the Japanese would buy U.S. fighter aircraft from us while at the same time they are willing to let their companies charge exorbitant prices for goods at home in order to subsidize their ability to be able to dump in our marketplace and steal market share. If you have not read Jim Falice's article on Japan I recommended it to you. I think people are beginning to understand that we have to do something differently and behave differently.

I am deeply concerned, as the Chairman is, that we in Congress joined in an agreement with the Administration, the last Reagan administration about what NIST was suppose to do. Now we find that not only is NIST incapable of doing anything. but it is almost being rubbed off the map by virtue of lack of funding. I believe just yesterday or the day before you made a speech downtown in which you—and I quote—called for the, "industry led business/government partnership," and spoke of a need for, "a strategy to innovate, produce, market, and sell world class products in each and every industry."

My question to you is how are we implementing these provisions? How are you going to innovate and follow through on the mandate of NIST and its responsibilities? And what is your response to Japan now, on May 9th? Where are we going, Mr. Secretary?

Secretary MOSBACHER. I agree with all of you that we do have a problem and the competitive advantage we had has evaporated, and we do need, with industry, private sector in the lead, to develop new strategies.

We on the government side, I think with the Omnibus Trade Act that you passed, have the tools from our side for market opening. That I promise you as far as anything I can do to accomplish that, I will do that. That is the first step I know, but it is one that has not been constantly and consistently followed either over the I do not know how many years.

I think besides enforcing those things we already have in place, we need to encourage by both the capital gains tax reduction, by the R&D tax credit being permanent, by perhaps doing—I say perhaps because it is not something that is totally agreed on at all. I will eliminate totally. It is not agreed on within the Administration—but to move through the antitrust relaxation in areas, particularly in the HDTV and related areas, and through general work with industry allowing them and encouraging them in the R&D and consortia and manufacturing. These are things that we can do and should do.

Senator KERRY. Let me ask you this question. Do you believe we can get into the HDTV market without changing the antitrust laws? It is a simple question. Can we get in it without?

Secretary MOSBACHER. Let me say I personally see it as being very difficult.

Senator KERRY. I think it would be impossible. The Japanese have spent $700 million already and they used high-definition televisions diromg tje Seoul Olympics. We are not even in it. Why are we playing games with words, Mr. Secretary? It concerns me greatly. What does industry-led mean, picking winners and losers?

Is it not a fact that if we are going to get into the HDTV market that we are joining together to pick a winner? It is a fact, is it not?

Secretary MOSBACHER. I think if the private sector does not want to pursue this without massive infusions and leadership of government where they are, in a way, living off the fat of the land, then there is nothing we can do to get into HDTV unless the private sector is willing to take the ball and run with it.

So, yes, we can be helpful to them, but we cannot—It is the old lead the horse to water but cannot make him drink.

Senator KERRY. The private sector has indicated its desire to move in. Let me ask you the question this way. Is there a national security interest in the United States getting into HDTV?

Secretary MOSBACHER. Yes, I think there is.

Senator KERRY. And that national security interest is tied to military products, to the computer chips, semiconductors and so forth, is it not?

Secretary MOSBACHER. Yes. I do not think you can separate the military needs in this from the commercial needs at all. I agree with you.

Senator KERRY. IBM, AT&T and others have bemoaned the fact that they cannot get into this market, have they not?

Secretary MOSBACHER. That is correct.

Senator KERRY. So the private sector is dying to move forward, it is not?

Secretary MOSBACHER. Well, I hope so.

Senator KERRY. It is dying while trying to move forward.

Secretary MOSBACHER. If they were really ready to move forward, they would have. I think, frankly, the problem is that they are hoping, what I use to call in the private sector, Uncle Sugar will fund it. I do not think they should depend on that. I think it has to be a combination of working with the government, but it has to be that the private sector will still take the lead. I think they also have to know that they are not going to be cut off at the knee by not being backed as far as the policy and the continuity, which we have not always done historically.

Senator KERRY. The bill that I am submitting with respect to the antitrust laws does not cost any money. All it does is change the antitrust format and the Clayton restrictions so they can move forward.

Why are you not committed to that at this point?

Secretary MOSBACHER. The truth is I have not read it, but I——

Senator KERRY. I am not talking about my bill, but the concept. Why is there not——

Secretary MOSBACHER. Because we have an interagency ongoing review now that this Administration has been in a little over 100 days, and we have not completed our work in this area. I am not saying we will be or will not be, but that is why I am not going to stand up here and say we when we still have a lot of work to do on it.

Senator KERRY. I see that my time is up.

The CHAIRMAN. Senator Lott.

Senator LOTT. Thank you, Mr. Chairman. Mr. Secretary, I had not expected that I would find myself in the position of trying to help or defend you this morning, but that is the way I feel right now. I do think that you are entitled, at the beginning of a new Administration and as a new Secretary of Commerce, to have a little time to review your hand and get the people of your choice on board, and I think you need a little more time to try to respond to some of the questions that were asked of you. I do think that time is running out. We need to get rolling here with your team and the President's team in Commerce. I notice we have confirmed very few people in your department. Do you want to respond to that?

Secretary MOSBACHER. One.

Senator LOTT. Could you use a little help? You know, we need to move that along. We talk about the FBI, the President, everybody, nobody, somebody is to blame here, but you are running out of time. You need your team on board and you are going to have to answer some of these questions, not only from the other side but from this side as time rolls along. So push that along any way you can.

I am concerned, and I know you are concerned, about this list that the Chairman put out. It bothers you and it bothers me that there are major portions of industry in America that lost out and others are threatened. So we do need to deal with that problem. What bothers me is the pressure you are getting here today. It is the typical type of thing I have had to deal with for the past 16 years: where is the money? Let us solve this problem by putting more of the people's money, Federal Government money, in this or that.

Where I do agree with them is we do need perhaps some seed money, some federal involvement. Maybe the NIST is the place for it. Maybe we do not need a policy, but we need a strategy. Mr. Secretary, I hope that you will come back here this year with a list of specific proposals that will take the breath away from this committee, that will include your guarantee that you are going to aggressively assert the need for funding or not at NIST, that you are going to aggressively enforce our trade laws, which in my opinion have not been aggressively pursued by the previous Administration, and I do not know for sure yet about this Administration. I think you would want to do that, but I think you are up against a tough battle. There is a lot more that needs to be done in that area. I commend you for what you did on FSX. I personally do not right now think you did enough. I am still teetering in the balance on that one but leaning against the proposal. But I think you made an effort internally to make it better.

Give us specific recommendations on the R&D tax credit being made permanent, capital gains, antitrust areas. On antitrust, I am not sure I would want to go necessarily the way the gentleman from Massachusetts would, but I think it is an area we are going to have to deal with.

If we are going to have to have consortia in some way, what is your position on that? What is the government's position? Run down a list. Let us have a strategy. Are you going to do that, and how do you respond to those things that I enumerated here?

Secretary MOSBACHER. Senator, first, thank you for your understanding. Yes, we are going to come back with specific recommendations. It is early in the Administration. We have not had an opportunity to go through all the interagency checks that you must do before you decide on what policy and the President, who will make the decision, decides what policy to come up with. That does not mean that we are not very, very active getting all the pieces together and getting a lot of potential options together, which is what we are going and have been doing and will do. We will come back to you with specific recommendations.

I agree at times through our history that we have not been really vigorous in enforcing the trade laws and that, but I think the first opportunity we had in this Administration where we thought the egregious oversight or underdoing was in telecommunications in 1377. That was the first olive out of the jar. There we did cite the country that we felt was not pursuing an open market policy.

I believe you will find that we will be enforcing the laws correctly.

Senator LOTT. Mr. Secretary, are we going to get some recommendations up here pretty quickly for people to come into your department to help you?

Secretary MOSBACHER. Yes, you will be. Despite my counselor on my right saying I should not mention it, I was upset with the White House very recently and found that one of the chief applications that we have that has gone back and forth, and it was really back in our court, there are so many regulations, so many things, that anybody who has accumulated anything, as this person had, that they had kicked it back to his lawyers. So there are a lot of them in a lot of different stages.

There is plenty of blame and credit to go around to all of us.

Senator LOTT. Not to us yet.

Secretary MOSBACHER. Not to the Senate. All of us in the Administration because it has gotten very complex.

Senator LOTT. One final word of encouragement to you. I know you are a can do Texan and you are going to want to make some decisions, but let me warn you, there is going to be a lot of bureaucracy that is going to resist you throughout your department when it comes to trade or fishery policies or anything else. You are going to have to roll over them and make decisions and come up here to make recommendations. We are looking forward to receiving those.

The CHAIRMAN. Senator Burns.

Senator BURNS. Thank you, Mr. Chairman. I have a couple of items after listening to Mr. Kuehler's testimony and his view on competitiveness and this type thing, and then going down the list of things that maybe we should be doing or not be doing, and then listening to Senator Danforth in the area of industrial policy.

At this point, should we be dealing with antitrust laws as they are on the books now, or should we be dealing with our own patent laws and the ongoing negotiations with foreign countries in their patent laws? I have a feeling that these two areas, when it all comes down to the lower part of the funnel, these may be the two issues that we will have to deal with the most.

Secretary MOSBACHER. I think, frankly, one of the many problems is many countries are not honoring our patent laws. We are losing intellectual property rights, which, as you know, is an overall, encompassing word which really is a euphemism for piracy of our copy rights and trademarks, all the way from books and films to plumbing supplies and pharmaceuticals, and covers the whole spectrum to the tune of between $40 billion and $60 billion a year that this country is losing, the companies in the country are losing. I think that is a primary problem.

Senator. BURNS. With respect to the development of research, we are talking mostly about HDTV this morning and where that technology leads us. How high a priority have you placed in the Department of Commerce on these ongoing negotiations in patent law?

Secretary MOSBACHER. I think what we have in the high definition television is—one of the first things we have to settle is the standards and that is a problem that we are working jointly with the State

Department. There was a standard that was proposed originally that we had first felt was a good standard. As we have had more of this country's companies study it, they backed away and do not recommend the originally proposed standard. We need to review it and come up with a standard and move with, of course, cautious but, subject to making sure we do it fully, full speed.

Senator BURNS. My whole premise for asking this was, it seems like we do a great job of developing technology in this country, but not of bringing that technology into consumer production and into the market. Thank you Mr. Secretary, for coming down this morning. I appreciate that.

Mr. Chairman, is Mr. Kuehler coming back?

The CHAIRMAN. Yes, he is here.

Senator BURNS. I have a couple of questions and I would submit those questions for the record but if he is coming back——

Thank you very much.

The CHAIRMAN. Very good. Senator Bryan.

Senator BRYAN. Thank you very much, Mr. Chairman.

Mr. Secretary, your Department has made available some data to us that ought to be of concern and, indeed, alarm to every American. U.S. companies' share of domestic American market: 1970, color televisions, 90 percent, 1987, 10 percent; ball Bearings, 88 percent in 1970, 71 percent today; machine tools: 100 percent in 1970, today 35 or 40 percent, depending upon the type of lathes or machining centers; semi-conductors, 89 percent of the market in 1970, today 64 percent; semiconductor manufacturing equipment, 100 percent in 1970, 1987 it is 75 percent. My question, does this alarm you?

Secretary MOSBACHER. Yes it does, Senator, it certainly does. A little bit, of course, is due to the fact that the rest of the world would normally be catching up with the only power that emerged from World War II with all the capabilities. But it is still does alarm me.

Senator BRYAN. The base share, Mr. Secretary, is 1970, not 1945, if that was the statistical base, I think that your point would be more persuasive. Now if this concerns you, do you believe that we can regain the competitive edge in these fields by simply doing what we have done in the past?

Secretary MOSBACHER. No, I do not. And I think that is the reason this Administration is spending so much time in both inter-agency meetings and meetings with the private sector.

Senator BRYAN. Mr. Kuehler, who was the witness that preceded you, and I know you did not have a chance to hear his testimony, but, like yourself, is an individual of stature who comes from the private sector. And I thought he made an eloquent argument for what I would call a public-private sector partnership in these emerging new technologies that are becoming part of the commercial market place in the 1990s and the century beyond.

My question to you is do you believe there is a public role? Let us not talk about money, just for the sake of argument. Is there a role for the Government in terms of helping industry?

Secretary MOSBACHER. There is no doubt that there is a role of the Government in helping industry.

Senator BRYAN. What do you think that role ought to be?

Secretary MOSBACHER. I have mentioned a few of the points, but let us review them. Certain tax elements, the capital gains reduction. We have got to lower the cost of capital in this country. It is one of the main reasons we have not been competitive lately.

Senator BRYAN. Should we not be addressing the budget deficit in a realistic manner if that is a concern?

Secretary MOSBACHER. I think the budget deficit is a major part of it also.

Senator BRYAN. Do American businesses not pay, in effect, a heavier cost of borrowing money to expand new capital and new development then do the Japanese because we pay a very heavy price for this deficit that we are carrying.

Secretary MOSBACHER. There is no doubt about it.

Senator BRYAN. In addition to investment tax credits and in addition to capital gains, what would be the extent to which you would involve or invite Government participation. I am not talking about domination, I understand where you are coming from there. What would be the limits that you would impose upon the role a government would play?

Secretary MOSBACHER. Well, I think the antitrust area, although once again we have not changed the policy review, may very well be another area where we want to unfetter the private sector.

Senator BRYAN. So, we have antitrust, we have capital gains, and investment tax credit. Any other areas that you think are appropriate for government to participate and play a role in helping this country regain the competitive edge that it once enjoyed in these fields?

Secretary MOSBACHER. Well I think it is being done in DARPA. In think some help in the cutting edge of new technology in the R&D area is and has been appropriate.

Senator BRYAN. Have you had a chance to evaluate the effectiveness of the consortium that was put together in Austin, Texas, a few years ago? It was led initially by Admiral Bobby Inman, who I think is a very cerebral and a very, very effective individual in terms of his advocacy for a policy that needs to be undertaken by this country.

How effective has that been, Mr. Secretary, if you have had a chance to evaluate it? Is it a good model for us?

Secretary MOSBACHER. Well, it has been quite effective and as you undoubtedly know, Senator, there is a Commerce study that indicates that. As to how good a model in HDTV and other areas, there is some question. It seems to working well in the semiconductor area. It is working well, I believe. And some related role might be appropriate. We have been talking about the old RCA model and many others. But I think any specific recommendation at this point would be premature.

Senator BRYAN. The study that was conducted by MIT addressing the productivity levels in American industry was not altogether heart warming or encouraging, as you know. One of the points that Lester Thurow and others made was that there seems to be an attitude in the private

sector, a failure to recognize how serious this international or global competition is.

Having just recently come from the private sector, what is your assessment? What is your own personal experience? Does the business community, and here I am not talking about the giants, the IBM's and others who have been here and made, I think, a compelling argument. Does the business community in American understand how serious this problem is in terms of our international stature, our standard of living and where this country is going to be at the turn of the century if we do not change our ways?

Secretary MOSBACHER. I think they are just beginning to glean the problem. I think, frankly, this study as well as others will help in many regards, just as the Malcolm Baldridge Quality Award is helping in making the companies, not just the largest companies, but the rest of the this companies in this country think (a) of quality, (b) that they must be internationally competitive and think about exporting, (c) that they must change some of their status quo methods which do not make them internationally competitive, and finally make sure that we in the Government do our job as to enforcing the laws we have got.

Now, I think we have to make sure also that the private sector does not think if we do that that they do not have to do much. I think we have got to make sure that the private sector realizes that they have got as big job to do as we do and they need to study things like this MIT report, too.

Senator BRYAN. Thank you Mr. Secretary, my time is up.

The CHAIRMAN. Senator Rockefeller.

Senator ROCKEFELLER. Thank you. Mr. Secretary, I want to congratulate you on your role in the FSX agreements and your leadership in general, in toughening up on trade relations and being more realistic about what is going on in the rest of the world. And I hope that that will follow with the discussion that we are having this morning.

I thought that Senator Danforth and Senator Gore's questions were right on target. Does industry really respond? Can they go ahead and do this by themselves or is there a role for government and in and fact is there a pretty strong role for government?

A year ago, the Japanese invited lots of American companies, including IBM, to participate in a consortium in which they will be doing research on superconductivity. Not one American company, including IBM, chose to accept that invitation. Some of them joined as associate members, but none joined as active members. There was a fee involved. I find that interesting.

Pat Windham and Tom Cohen have written for those of us on this Committee, their usual superb memo. And in this memo, they point out something which I believe. That industry leaders—while they obviously have leadership capacity and are willing to fund a lot of research, but they get very nervous about funding research in three particular categories. That is, when products and profits are far off, as is the case with superconducting materials and an awful lot of other things that are important in this world. Second, when the necessary

facilities are very expensive. That is also a problem for superconductivity. And, third, when the area of technology poses special risks for them, such as reentering the television market.

Now, you really could take those three areas and say that if industry is nervous in terms of funding research in those three areas, we are in a lot of trouble. And that one of the answers for the long list of areas where we are not competing could be due to a collective industry nervousness about research and development, far greater perhaps than they would be willing to admit.

Dr. Robert White of the National Academy of Engineering makes also an interesting point. He says that the political consensus has been that it is the obligation of the Federal Government to support the science base of this Nation, but that this consensus has not extended to the support of technology base. Then he goes on to say that anybody who thinks that private industry is going to put up sufficient funds to support our technology base—with all of the problems of give and take, and the free market determining allocation of resources, et cetera is, in my words, whistling up a tree.

My question is, I recognize that industrial policy is a bad word. I recognize that the previous administration had a feeling that if industry is simply unleashed to do what it does best, that we will solve our problems. On reflection, I am not so sure that is anywhere near the truth at all. And I am not so sure, Mr. Secretary, that you believe it is anywhere near the truth at all.

My point to you rather than my question, I suppose, would be one that both Senator Gore and Senator Kerry. That is that I think it has come to a point in this country where collaboration between government and industry or industry and government, however one wishes to phrase it, is not only essential but perhaps life saving in terms of our fundamental manufacturing. Business says do not let the government do it, but when they get in trouble, they come. And, indeed, there are questions even on the SEMATECH consortia whether or not that is an outdated approach. There is a lot of thinking which suggests that the modern Japanese consortia, in fact, are not making the major breakthroughs on technology anymore because of the way they have restructured their funding of research and development. Rather they are only making incremental progress.

So while we scramble for consortia, and we complain about our lack of progress, industry says they do not want an industrial policy. The Reagan administration said that is a bad word. The Bush administration has not had time yet to say yes or no, and I agree with Senator Lott, you have not had time to really put together a policy.

On the other hand, we are steadly declining. And I am not sure that private industry in fact does have, collectively or individually, the collective capacity to do these things for us.And I hope that the Bush administration may be looked back on in history under the leadership which you and the President can provide as the administration which really did understand and which really did something about the fact that collaboration means collaboration. And that it has got to be for

real, and that there is money involved, and that is no way around that. Private industry has to give up some of its sacred ideology because it simply is not performing at the level that it has to, particularly with respect to research and development.

I do not know if you care to comment on that or not.

Secretary MOSSBACHER. Let me say I think we are struggling with the same thing. You put it much more eloquently than I could. But I think this administration will be struggling with and looking for the proper role and the proper way for government to help industry. And it varies between those tax areas that I have discussed and getting more involved.

And honestly, it is going to be a difficult decision to make for those of us who have always believed and still believe that basically the private sector should always take the lead.

Senator ROCKEFELLER. Mr. Secretary, one final point. We have just concluded a science and technology agreement with the Japanese in which they have agreed to open up many more of the federal and university labs to us, as ours have been open to them for the last 35, 40 years. Looking at how long we have put up with this there really is no miracle to the Japanese economic growth.

The only miracle is that we in our country sold in some 35,000-40,000 transactions our technology, and some of Europe's, for a cost of a mere $17 billion. The Japanese have used all of this technology to create their so-called miracle. It's a miracle which we sold them. Its not a distinguished part of our history I would think.

My concern about the science and technology agreement is that now that the Japanese have agreed to open up that we're not going to take advantage of it. That the same kind of arrogance, that the same kind of complacency will show itself, and we're going to use excuses. It's too expensive to live over there. We don't speak the Japanese language, and then we're going to say, Japan, you pay to teach us how to speak Japanese. You put up the costs for our housing, and that may all be real.

But I'm also concerned about the American capacity on an individual basis, private sector basis, to respond to overarching public needs.

Secretary MOSSBACHER. I agree with the last point completely, Senator, and I think complacency and a lack of long-term thinking on our part, and I think the capital gains tax reduction is a part of that. It has to be a mental set. Part of it is caused by the analysts who keep asking and demanding from the corporate people next month's next quarter's earnings and view for what is going to happen short-term.

In my view, they should be looking at what is going to happen, three, five eight years. But it's a whole difference of attitude in that, and certainly the technology aspect is a major part.

The CHAIRMAN. Senator Gorton.

Senator GORTON. Thank you, Mr. Chairman.

Mr. Secretary, as I told you privately last night, I believe this nation owes you a great debt of gratitude for the leadership which you provided with respect to the recently concluded FSX agreement with

the Japanese. In fact, my absence from a portion of your testimony here was in order to speak in favor of that agreement on the floor of the Senate.

And you made a very difficult question, in my view, a much easier question. You are already a success in your position for that reason.

It is also my observation, which I remarked on the floor, that much of the passion and the debate over the FSX goes far beyond that particular fighter contract and into a very grave, genuine and justified concern over overall trade relationships with the Japanese, and what you have been testifying about here today has a very great impact on these relationships.

The Chairman began by asking how much more money the government ought to spend. Senator Danforth took a somewhat different position. I am looking now at the testimony of Mr. Kuehler from IBM who preceded you here, and I would like to go through very briefly the five or six recommendations which he made and ask you whether or not you agree that each of those is appropriate, whether in this case the public sector and the private sector see eye to eye.

He recommended that we make the R&D tax credit permanent. He lauded the National Cooperative Research Act, but wanted to do more to lessen the impact of antitrust laws on joint research and development.

He asked that where the United States is in the lead in intellectual property fields, for example, that the government do much more by broadening GATT and by aggressively pursuing the piracy of intellectual properties.

He spoke about getting our fiscal house in order through reducing a budget deficit, and he did commend NIST, DARPA, the National Science Foundation, and the Commerce Department particularly in asking that it bring together industry, government, and academia in a way that you've already testified to here.

Is there anything with which you disagree in that series of recommendations and any major area which you feel he's omitted which you would add?

Secretary MOSSBACHER. No. I think I totally agree with each one of those. I see nothing there that I would not agree with. I would say that if we pursued all of these and also I would add if we enforce the trade act and the previous acts that were passed, whether it is 301 or antidumping or counterveiling duty and do it constantly over a long period, this would also give great solace to our business community.

Senator GORTON. Let me cover another area and ask whether or not in the course of all of the efforts you are making to come up with recommendations from the department for the administration and for us, whether or not you have a concern for and are working with the Department of Education in connection with encouraging both higher quality education in the field of math and science and encouraging more of our young people to spend more of their school time on those subjects.

Secretary MOSSBACHER. Oh, yes. It is a very high priority of the President and Dr. Cavazas, Secretary Cavazas and I have spent time discussing it. I think there's no doubt if we are going to be more competitive and build the quality of our goods, we are going to have to have a better educated populace from the proverbial rocket scientist on down to the regular work force that must know how to read and write and follow instructions and do mathematics, at least on a rudimentary basis much better than they do now.

Senator GORTON. I would like to pursue very briefly another and mostly unrelated subject. One of my most important and successful constituents is John Fluke Manufacturing Company, which is highly competitive worldwide. It has a great concern with the research development dissemination of measurement standards through the National Institute of Standards and Technology. This was referred to by the Chairman, I believe, at the very beginning of his remarks.

Can you tell me what role you do see in the immediate future for that institute both with respect to measurement standard and in more general terms?

Secretary MOSSBACHER. The measurement standards we must move towards the metric standard as far as our international competition whether we personally like it or not, and it is a high priority for us. There is, I think, the additional reason and incentive that companies and other people have today to move that way because as EC 92 comes up and this 320 million person market opens up, it is going to be based on the metric system.

We have committed to moving our business towards this, and it is a high priority with this.

Senator GORTON. Once again, Mr. Secretary, I want to commend you for your fast start in this position and thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

Senator Danforth, do you have any questions?

Senator DANFORTH. I was wondering, Mr. Secretary, you said in developing the administration's policies with respect to competitiveness you have discussed the matter with a number of business people and you are continuing to discuss them. It makes sense to me that before the government announces a policy on how it is going to be helpful, it talks to the people it purports to help.

I was just wondering if any of these business people ever quote to you that old saying that there are three things people never believed: the check is in the mail, I will respect you in the morning, and I am from government and I am here to help you.

Secretary MOSSBACHER. I do not know anything about the first two, but the last one. I have tried in some talks, and I do not know why, but everybody laughs.

The CHAIRMAN. Do you have any questions, Senator Pressler?

Senator PRESSLER. Not at this time.

The CHAIRMAN. Mr. Secretary, sure it is good to consult, but in looking for the proper Commerce Department role I am rather nonplussed because you testify very strongly for the National Institute of Standards

and Technology. You supported that. That is the policy unless we are going to amend it. We found strong support for it. Industry is looking to it. The electronics industry, the computer industry and everything are looking to you to lead. It is not the philosophy of whether it is industry-led or government. You have got no chance in the world of government leading it, I can tell you that right now. We do not have the money, and what happens is industry leaves, l-e-a-v-e-s. I used to work on bringing business down to my State, and we are still bringing it down to my state.

But you find a lot of industry leaving now, going to Mexico. There are 13 General Motors plants down there, Chrysler which we bailed out has gone to Mexico. It is the industry that is competitive, you know, having come from that particular discipline.

We are not looking for philosophy or who is going to lead in dancing around the fire. We do have very conservative, really, moderate kind of initiative here to look at namely SEMATECH. You have agreed. It is working. Everyone else has agreed. That is private and public together.

If we are going to stay alive, we need to get on board. We need a Deputy Secretary of Commerce and Under Secretary in charge of technology. Mr. Kuehler, who I never saw him until this morning, you can appoint him if he will take the pay cut. He understands. He understands the text part of it, the education part of it, and everything else.

But you all act like you do not expect to win. You better hurry up and get your team on board and follow through the laws that you pledged when you took office to support and administer, or change them. Recommend a change and say it is a bad initiative or whatever it is. But your testimony was in favor of the current laws. I find bipartisan support for consortai throughout government and business. It is a proven approach, is very modest, and that is what we are looking for. I am not just looking for money. We are looking for a level of authorization here in this committee on your particular department, not on tax credits, not on the antitrust laws, not on R&D investment, and capital gains and all of those other. That is a part and a role for other committees.

You have got to roll, and we have not heard, frankly, your testimony on it. I appreciate the position that you are in with the OMB, but you better break that crowd around and tell them we have got work to do if we are going to catch that ball. We cannot afford to find whether it is going to be industry led. They are going to lead, and they are going to leave the country. Business has joined with Toshiba because they do not know which way the government is going. They got a partnership deal because they do not know whether their government is going to help at all.

And some businesses are ahead of the market. There is no indolence or apathy, and you know that better than any industries out there ready to go. And if they are not going with their own government and stay on shore, they are going offshore, and that is what is really happening. I mean, we are not going to sit around here and lose our standard of living, lose our industrial backbone, and play an Alfonse and Gaston on who is going to lead. That is over with.

I will be glad to hear your comment, and we do appreciate your appearance, but we are, you can see, restless for your recommendation with respect to your own department, your own office as Under Secretary, Deputy Secretary, and the level of authorization for this particular endeavor.

Secretary MOSBACHER. Mr. Chairman, I am anxious to and concerned, and, as I said earlier, I have been having many, many meetings with the private sector, other inter-agency groups, some of you and the Congress, and, as you know, there was zero funding that was in this by the Reagan budget, and when we took over that budget; it remained at zero funding.

I will be talking to the OMB about the possibility of changing that. There also was $15 million in ATV research which Congress, in its wisdom, decided to move to another area.

I just agree with you, though, and I do totally agree with you that we must work together to move this forward and we are developing a policy. And I hope that, before too long, I can come back to you, as several of the senators said, with specific recommendations. I just do not have them yet.

The CHAIRMAN. We appreciate it. Senator Pressler does have one question.

Senator PRESSLER. I do have one question that you may be able to address. I know you have addressed part of it earlier today, and if it is repetitive, just say so and I will read the record.

But it seems that, so often, we develop the technology for something first and then lose out to the Japanese in the marketplace. They imitate or take our technology and they carry it one step further; they take an idea and they trump the ace, so to speak. We have the ace but then it is trumped by someone who carries it maybe a half a step further but then is able to market it.

And I think earlier you discussed what would prevent the same thing from happening with high-definition TV; what would happen if the government and industry pumped millions of dollars into this technology just to lose out to the Japanese a few years later because they can produce it more efficiently or market it more cheaply.

But there seems to be a pattern where, for some reason, American companies cannot compete effectively with their Japanese counterparts. We develop the technology first and then lose out to the Japanese. Why is that?

Secretary MOSBACHER. Well, I had a very interesting visit with the Ford Motor people yesterday, and I think they are not alone in this, but they are part of what this country's industrial base is beginning to see. And that is, just what you say, that we must move more quickly and more efficiently from the R&D stage to the manufacturing stage.

They have worked up a very good team effort that brings in the R&D engineers and the cost-control engineers and the manufacturing engineers and the accountant-type thinking people who work out the costs on these things so they can move more efficiently, more quickly, from that first stage to the latter.

Because, certainly, through the years and today, also, we are the best in the world at the R&D and we do well at the manufacturing once we get into it. But there has been a big gap between the two. I think this team effort and the spin-off ideas that go with it could be a quantum jump for us in this area in this country.

The CHAIRMAN. On that particular point, I had the same visit to Detroit five years ago. They have Japanese robots assembling foreign parts. The industry is not waiting on this government; they went right to the Japanese government.

I asked them, I said, why do we not have machines from Cincinnati, Militron, or Giddings and Lewis? We have got a lot better robots. They said, yes, but the Japanese help usfinance it.

There you go. And their financiers put up a line of credit for the state of Michigan. We are in the real competition, waiting around, and you will not get billions and everything else with the government taker. That is not the danger. The danger is a lack of understanding of the competition that we really face.

They have been in here, they have taken over, and, if we were at an agriculture meeting now, we would talk about the Japanese buying downtown Los Angeles and all the buildings. Now, on the meat proposition—we ought to have Senator Exon back here—they are just buying up the ranch. We had that last night; they bought the whole ranch, the whole meat production. And now they say they are letting in American beef. That is Japanese beef they are letting in, made in America.

So we are losing every day, and they had better hurry up the meetings, please. And thank you.

Secretary MOSBACHER. I hear you loud and clear, Mr. Chairman.

The CHAIRMAN. Thank you very much, Mr. Secretary. We appreciate it. The committee will now hear from Mr. Hubbard, the vice president of the American Electronics Association. Miss Hubbard, excuse me, Miss Hubbard. That is better yet.

Let us have order now. this is most important testimony—and I do not say that facetiously—we do have Miss Hubbard, vice president of the American Electronics Association. Miss Hubbard, we welcome you to the committee and we would be delighted to hear from you at this time.

STATEMENT OF PAT HILL HUBBARD, VICE PRESIDENT, SCIENCE AND TECHNOLOGY POLICY, AMERICAN ELECTRONICS ASSOCIATION

Ms. HUBBARD. Thank you, Mr. Chairman. I was going to ask that it be entered in the record that I was a woman, but you have done that very nicely. I just hope I am not a disappointment.

The CHAIRMAN. Not at all, no.

Ms. HUBBARD. I want to thank you for your invitation to testify today on industry-government cooperation to speed the commercialization of new technologies, and specifically in relation to advanced television, ATV, which includes high-definition television, or HDTV.

The American Electronics Association is a 46-year-old, nonprofit trade association. We have some 3,500 companies throughout the country. We have a trade office in Tokyo, with 150 U.S. subsidiaries there. We have a small presence in China.

And I am awfully pleased to say, and certainly not last in terms of priority, that we have recently admitted universities to our membership and we have 45 U.S. engineering universities. Our members design, manufacture or conduct research in electronics, electronic components and related information technology products.

I am a vice president of the association; I have responsibility for science and technology policy and education. Most of my issues this past year have been to assist an industry-wide leadership initiative to establish an environment that encourages new entrance to design and manufacture for the new ATV markets.

I might just note, unfortunately Senator Rockefeller is not here, but we have had, for five years in the association, an activity aimed at providing Japanese language training for U.S. graduates, engineering and computer science graduates, and putting them to work in Japanese host company research labs for a year, and that is done with U.S. money. So there is an initiative there to try to take advantage of new opportunities to access Japanese R&D.

When I joined the association 10 years ago, my speeches included the phrase that "while electronics is presently the sixth-largest U.S. industry segment, by the year 2000, we expect it to be second." I have to say I was off by 15 years. Today, as Jack Kuehler has said, we are number one. We are three times larger in employment than automobiles, and we are nine times that of the basic steel industry.

More importantly, we are the tool maker for many other industry segments. We believe we drive productivity and quality improvements. We also believe, because we are part of the electronics industry, which is the key industry for the future, worldwide, that we are, therefore, of strategic importance to the U.S. economy as well as national security.

You have heard from the previous speakers, especially Jack Kuehler, that the long-term leadership of U.S. electronics industry is under serious threat today. Our country has an uncertain response to the changing international environment, a very high cost of capital and declining educational standards.

These concerns are summarized in a recent report we did called "America's Future at Stake: Winning in the Global Marketplace." If I may do so, I would like it entered as part of the public record. [1]

The CHAIRMAN. It will be included in the record by reference.

Ms. HUBBARD. Thank you very much. Between 1984 and 1987, we lost market share in 10 electronic segments. Global economies of scale, driven up in-use consumer products, are becoming increasingly important in achieving competitiveness. One-third of our electronics trade deficit with Japan, somewhere around $7 billion right now, is due to a lack of U.S. presence in consumer electronics.

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[1] The attachments were not reproducible.

ATV offers a once-in-a-lifetime gateway for U.S. re-entry. New market opportunities from advanced television technologies and their many spin-offs—and I want to emphasize military, industrial and commercial—range to $5 billion to $20 billion by the year 2000.

On the downside, and, unfortunately, that downside is very large, should U.S. companies not participate, ATV offers a pathway for other countries to capture U.S. market share in non-consumer electronics fields such as computers, semi-conductors and telecommunications.

My written testimony, which I submit to you, provides details on the Boston consulting group's perspective on what it is going to take to develop a U.S.-based ATV industry.[2] I will limit my oral comments to what is at stake, why the U.S. needs to participate, why it cannot do it alone, and then I will summarize recommendations from that report, which is given to you in a much larger fashion in the report submitted.

I want to point out two omissions in that report, however, and they are key; there are just two word omissions.

One is, there is a statement, "73 percent of our trading partners do operate in economic systems similar to our own.' I would like to tell you that the "not' is missing: 73 percent of our trading partners do not operate in economic systems or with trade policies as we do. And the second has to do with a recommendation on patenting and licensing a standard, in which I will point out the missing word when we come to it.

What is ATV and why do we need to participate? What is all the hoop-lah about? You are already aware that it certainly is a television technology which brings visual images of sharpness similar to a 35mm film. It has wide pictures and digital stereo sound. And if you have seen, you tend to want it.

But it is important to emphasize that AEA is involved in the ATV issue for very, very different reasons than companies like Zenith, Thomson and Philips. In fact, they and most of those involved in public debate on HDTV look at it as simply an improved television technology, and, of course, it is that. But, and again, I emphasize, it is far, far more than that.

There are many markets, selected government programs, the computer industry displays, military and commercial applications that are involved here. Most agree that ATV will bring on, eventually, a merger between—of—digital-based communications, computer and entertainment into inter-related, high-resolution technologies and markets.

The electronics-based industry that results from this merger may well underlie the world's economy and shape its political organizations in the 21st century. The stakes inherent in HDTV, again, is that it is a fundamental new imaging technology. Saturday morning cartoons may be the market entry point, but it is going to move very quickly to impact and capture markets that are in non-consumer fields.

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[2] The attachments were not reproducible.

Electronics is an industry really unlike most others. We have many interrelated segments. We call ourselves a technological food chain; it is very similar to the well-known biological food chain. Each segment is in some way related and dependent on the other. When one industry segment is damaged or lost—and we certainly have lost consumer electronics some years ago—other segments feel what we call a ripple effect of the loss.

Should the U.S. not participate in ATV, then the impact is two-fold: loss of market volume and loss of technical know-how in other parts of the electronic food chain. These losses, especially of semi-conductors, brings up the strategic, critical issue of national security, which is added to the issue of economic concerns.

It is believed, in time, that every key electronic industry segment will be impacted by ATV technologies. In effect, then, the stakes for non-participation by this country are very, very high. We must gain an industry to retain many industries. Just a note, that, if we lose market share in these non-consumer industries, we will also lose some very key technical driver jobs. They will be engineering, design, et cetera. So there is certainly an interest on the part of the general public, I think, in this issue.

The question is often asked, why can the U.S. not re-enter on its own? We heard it asked today. The reasons are multiple. I will summarize them. U.S. companies lack ATV technologies; they certainly have some base technologies, but they lack the kind of technology that is going to be cost-effective and competitive. We have lost the related manufacturing, marketing, supplier and distribution infrastructures in this country; they are gone.

And we face, not just multinational companies abroad, we face multinational company consortia in Europe and Japan. they have substantial funding from their governments, both for R&D as well as for what we call pump-priming to encourage the consumer market to buy, and with some protection in their home markets.

Someone said it is trench warfare, and the U.S. lacks quality of manufacturing infrastructure needed to support a video business. And we are also weak in some key required technologies, in particular, high-resolution CRTs, flat-panel displays, random access memory, manufacturing processes, and digital signal processing—system and component infrastructure, as well as technological infrastructure.

And, again, you have heard it over and over this morning, the cost of capital is simply too high. Japan has a cost of capital four times less what we do.

Lastly, the return on this investment is low. It is going to take a long time horizon, something that neither government nor industry, I might suggest, are used to. It will take time to reach break-even. And it is especially financially punishing for new entrance.

These return levels just do not fit investment criteria for U.S. private industry, venture capitalists or institutional investors. The problem is that we have to invest now, in the 1990s, in order to be positioned for returns in the year 2000 and beyond.

First of all, AEA has studied this issue for a year; we are not newcomers to the problem, though the complexity sometimes makes us feel so. We had a task force that worked very diligently; 20 companies, some of whom are represented in the audience here today, who worked on the issue and studied it as, along with previous Secretary of Commerce Mosbacher's committee studied it.

We got to the point in February where we said the time for study is gone and we must act. We have to have a strategy. With that goal, 16 of those 20, joined by another 20, making 36, funded a study by the Boston consulting group to try to come to you today with a strategy for how we can, this country, can build an ATV industry.

I am pleased to tell you that the Boston consulting group has done an exceptionally fine job. They have interviewed some 94 people, they have visited plant sites in Japan and Europe and the United States, and I dare say, at least from my perspective, they know more about this issue than anything.

They have recommended strategies for solution which are: plugging holes in the U.S. technology base; pursuing breakthrough innovations; building a world-class manufacturing component and design infrastructure; selecting and administering standards in a way that fosters development of a strong U.S.-based ATV industry; making lower-cost capital available for manufacturing; and, somewhat unusual, investing in pump-priming, to boost programming or software availability which will lead—the programming will lead to the creation of a substantial consumer base. At least that is our theory.

I would like to briefly outline key components that they have recommended for a five-year program. The partnership process they propose has three basic steps. One is that industry defines the problem and recommends solutions—probably in that sphere of industry-led, Senator—I think we are here today to try to do that.

Number two, and this is to you, government puts in place programs and resources; and number three, and it is back again with us, though, again, number two and three are very much together in terms of time, is that companies then invest in R&D and begin manufacturing.

The major actions we are recommending for a government role, starting, now but funded in fiscal 1990, are to fund, very importantly, to fund the DARPA grant process, increasing that funding by $100 million a year for three years.

We are actually also, I think, in line with the committee's thinking in recommending that the role for NIST, as first envisioned in the trade bill, be given full scope. We recommend appropriating a minimum of $50 million to the Department of Commerce for NIST for construction of prototype systems, systems testing—and my comments are related to transmission systems—leading to recommendation of a standard to the FCC.

NIST would also patent the standards—we believe it is do-able—and patent the underlying technology related to the standard, and, through a structure, issue licenses with fees. Those fees would be based on the amount of R&D, design and manufacturing done in the United States,

the amount of semi-conductor chips used, and the amount of U.S. reciprocal access to ATV in other home markets.

A third component is to provide $500 million for low-cost loans and $500 million for loan guarantees with industry co-investment criteria for purpose of building manufacturing infrastructure and production of ATV products and working capital needs.

Now, central to all of this, I need to make two points. One is that, in these investments, we are talking about a match, dollar-match from industry; in fact, a minimum dollar match. Craig feels that DARPA, has told me that the DARPA process has brought forth proposals where there is definite capital risk-sharing on the part of government and industry, so that the industry is putting up easily a dollar for dollar, and, in some cases, more.

A cornerstone of these recommendations is the formation of something that we have called, for want of a better term, an ATV corporation. It is an industry-led, industry-government-academia-management entity. The idea is to provide an integrated, coherent program, a structure which can quickly recognize and make problems that develop be resolved as quickly as possible.

So one of its roles would be to guide overall ATV industry development; to take the underlying technology, patented underlying broadcast standard technology, own and license it; to administer the low-cost loans and loan guarantees on behalf of NIST and its NIST foundation to industry for manufacturing, again, monitoring and setting cost-sharing guidelines for industry. One of its ongoing roles would be to ensure that R&D technology grants, whether from DARPA or NIST, meet commercial needs; to monitor and alert appropriate agencies to undertake any dumping remedies required; and to execute pump-priming programs to encourage development of consumer markets.

We also recommend that the Department of Justice pursue changes in antitrust laws to permit joint ATV manufacturing and marketing. Additional supporting government policies: encourage a national policy to foster market-driven installation of fiber-optic cable, especially to residences; authorize the Department of Transportation and the FAA to develop a domestic source for follow-on display technology for FAA air traffic control system; request the U.S. Trade Representative's office to ensure reciprocal access by U.S. of ATV-related markets in other countries; to request the FCC and appropriate congressional committees to design incentives, perhaps, such as extended license terms to encourage broadcasters to invest in ATV studio and transmission equipment.

There is certainly a parallel industry role, a five-year program. We would undertake ATV technology developments through DARPA's R&D grants. We would participate in the ATV corporation; we envision that corporation as chaired by an industry person with the majority of its members from industry. We would undertake, in cooperation with NIST, the development of prototype standard systems, prototype design and manufacturing process technology.

We would form ATV ventures, and these would take many forms, we hope. We are looking at a very broad-based, very flexible structure in which many different entities can come together to participate in building, rebuilding U.S. consumer electronics.

There might be joint ventures of two or more, two or three companies, such as Zenith and AT&T; there might be consortia such as the limited partnership, somewhat on the RCA model. This would not preclude, and, we hope, would encourage small, start-up entrepreneurial companies. There will obviously be some individuals interested as well. We just believe there will be a variety of forms and we think that that is the American way.

The ATV ventures, then, would be pivotal in undertaking the design and manufacturing of the ATV products. They would bring company resources such as industrial lab technology, packaging technology, management resources, and, certainly, the taking of residual risks.

We think the industry-government partnership is the best approach. If we do not participate in ATV as a country—and this was the summation of conclusions from our task force—the effects on our economy may be drastic. If we do not participate as an industry, our leadership in technology, as well as the future sales of our products and services may be desimated. However, if we do seize the initiative, if we seize the initiative, we can create new opportunities, open huge markets and sources of revenue.

For America to re-enter consumer electronics and to build this ATV industry is going to take extraordinary measures and it is going to take unprecedented cooperation between industry, among industry, and between government and industry. We look forward very much to trying to work together to refine these recommendations and to refine the partnership. Thank you.

The CHAIRMAN. Well, Ms. Hubbard, we have found a second Undersecretary of Commerce for Secretary Mosbacher. I apologize. What I should have done is, rather than him testify was to have him just come and listen. You are way down the road and you are meeting the challenge and I really commend American Electronics Association for their initiative. That is industry leading.

I mean, we act like the government just started out yesterday and flounder around asking what are we going to do and what is Government's role? The government has already been into industrial policy. We have got tax credits, we have $15 billion in the budget we passed last week for agricultural support prices and import quotas to protect those support prices. We have the Export-Import Bank that finances our grain sales that we just approved to the Soviets this week, and airplace sales, industry and agriculture.

We have an industrial policy, but it is about the sorriest you have ever seen, and the others have got the state of the art. Now we cannot go and discipline our consumers, our population, but we certainly can meet the challenge in the studied way that you have given us. I mean, the electronics industry is leading, so we do not have to worry with that concern of the Secretary of Commerce.

This study was in the works for a year; 36 companies joined in, and 94 staff people. Now you have what you need outlined right down to matching funds and just exactly what role funds would play, and you gave us a dollar amount, which is in the ballpark. There is no question about it that we need more money over in DARPA; it is not an either-or. And we are going to try to put some more money into defense appropriations there for the ATV.

And, in similar fashion, we need to get $50 million more into the National Institute of Standards and Technology to get that outreach, to help research, to help small business, and to help consortia like Bobby Inman's computer-five down in Austin, Texas, or small businesses that have so much trouble commercializing and financing, that they go offshore.

The $500 million for low-cost loans and for loan guarantees, another $500 million is a modest amount, considering just in ATV alone the Japanese have already spent $700 million. We are not trying to topple their bet; we are just trying to keep us alive. Like you say, we have to gain an industry to retain one. I think that is the key phrase in your testimony. People have to understand where we are.

We have to lead, but its not because our industries have not invested or afforded the leadership over the years. It is like an industrialist told me years ago about textiles that I can compete with any company in Japan; I just cannot compete with the country of Japan.

And that is the name of the game today. And there is no use debating philosophy about who is going to lead and what the policy is going to be. Your report sets it out and you sure put what they call the meat in the coconut here. We have a real recommendation.

And I apologize for the rest of the members who had other commitments, we have a caucus going on now, and could not stay. But we will have you back again, if you do not mind, to elaborate on this, because I do not have any questions. I just have nothing but compliments for the comprehensive and deliberate way that the electronics industry, as a group, have afforded the leadership and have gotten us a real program that we can deal with that covers all of the spectrum.

You deal not only the fiber optic cable, you have got the FAA in here, the U.S. Trade Representative, the Federal Communications Commission, the private industry, the government. And it outlines, really, what is going to happen one way or the other. They are all going to fail or the weak link is going to fall by the wayside, and we will make just a minimum effort over DARPA and Defense, and then we will end up, really, buying from the Japanese.

We will be debating FSX on the floor this afternoon. In a way it is amusing. We will be begging them for their electronics in another five years to keep our defenses up.

I thank you very, very much for your presentation here and this paper that you have, and I am going to see the Secretary personally and deliver it to him and make sure he gets it so he knows that you in industry are leading.

Ms. HUBBARD. I do appreciate that. I would be pleased to return if the opportunity presents itself.

The CHAIRMAN. We really do appreciate it. The committee thanks you very much.

Ms. HUBBARD. Thank you.

(Whereupon, at 12:37 p.m., the committee was adjourned.)

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